U.S. DEPARTMENT OF COMMERCE
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PB-252 826

DETERMINATION OF EFFECTS OF AMBIENT CONDITIONS ON AIRCRAFT ENGINE EMISSIONS ENGINE TESTING - GTCP 85 APU, TPE 331 TURBOPROP. VOLUME 2

AiResearch Manufacturing Company of Arizona

PREPARED FOR
Environmental Protection Agency

March 1976

146040

EPA-460/3-76-009-b
March 1976

PB 252 826

DETERMINATION OF EFFECTS OF AMBIENT CONDITIONS ON AIRCRAFT ENGINE EMISSIONS ENGINE TESTING - GTCP 85 APU, TPE 331 TURBOPROP VOLUME 2

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Mobile Source Air Pollution Control
Emission Control Technology Division
Ann Arbor, Michigan 48105

301

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA 460/3-76-009-b		PB-252 826

4. TITLE AND SUBTITLE	5. REPORT DATE
Determination of the Effects of Ambient Conditions on Aircraft Engine Emissions Engine Testing - GTCP85 APU, TPE331 Turboprop	December 19, 1976 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) G. A. Slogar R. C. Holder	8. PERFORMING ORGANIZATION REPORT NO. 75-311636
9. PERFORMING ORGANIZATION NAME AND ADDRESS AiResearch Manufacturing Company of Arizona A Division of the Garrett Corporation 402 South 36th Street Phoenix, AZ 85034	10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. 68-03-2156
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air and Water Programs Office of Mobile Source Air Pollution Control Emission Control Tech. Div.,Ann Arbor,MI 48105	13. TYPE OF REPORT AND PERIOD COVERED Final Dec 1974-Dec 1975 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Under Environmental Protection Agency contract number 58-03-2156, AiResearch Manufacturing Company of Arizona, a Division of the Garrett Corporation, conducted full scale engine tests on a GTCP85-98CK Auxiliary Power Unit and a TPE331-5-251M Turboprop engine. The purpose of this program was to measure exhaust emission of HC, CO, CO_2, NO_x, and smoke at controlled (temperature, humidity, and pressure) engine inlet conditions. This data along with other available data will provide the data base for the determination of the effects of ambient conditions on gas turbine engines.

PRICES SUBJECT TO CHANGE

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Aircraft Turbines Emission Measurement Procedures		IC 21E 7

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited	Unclassified	301
	20. SECURITY CLASS (This page)	22. PRICE
	Unclassified	$9.75-2.25

EPA Form 2220-1 (9-73)

EPA-460/3-76-009-b

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by

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ENVIRONMENTAL PROTECTION AGENCY
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March 1976

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Publication No. EPA-460/3-76-009-b

DETERMINATION OF EFFECTS OF AMBIENT CONDITIONS ON AIRCRAFT ENGINE EMISSIONS ENGINE TESTING GTCP85 APU, TPE331 TURBOPROP

1.0 INTRODUCTION

The aircraft engine emissions measurement test program outlined herein was performed by AiResearch Manufacturing Company of Arizona, A Division of The Garrett Corporation, to determine the effect of ambient conditions on aircraft engine emissions under Contract 68-03-2156 for the Environmental Protection Agency, Emission Control Technology Division, Ann Arbor, Michigan.

The purpose of this program was to measure exhaust emissions of hydrocarbons, carbon monoxide, smoke, and oxides of nitrogen from an AiResearch Turboprop Engine Model TPE331, and a Gas Turbine Auxiliary Power Unit (APU) GTCP85, when tested under controlled ambient conditions of humidity, temperature, and pressure. The test program initially was to be 8 months. A supplemental program was subsequently added to investigate the necessary modifications to the turboprop engine fuel management system required to meet 1979 EPA aircraft engine emissions standards, and the program was extended to 12 months.

The ultimate application of data generated in the program will be the specification of correction factors for the effect of ambient conditions on small gas turbine engine exhaust emissions. Definition of these correction factors by Calspan Corporation may eliminate the requirement for controlled-environment testing of production engines to determine compliance with the EPA 1979 Aircraft and Aircraft Engine Emissions Standards after the humidity/emissions relationship is characterized for that particular engine type or model.

Therefore, all data gathered during this program was transmitted to the Calspan Corporation, Buffalo, New York, where the data was subjected to statistical analysis to assist in deriving an empirical correlation between variations in ambient conditions and exhaust emissions for each candidate test engine.

2.0 SUMMARY

This report volume comprises all final engine load conditions, and gaseous and particulate, emissions data reduction computer output for an 85 Series APU and TPE331 turboprop engine related to this test program. APU output data is presented first, followed by similar format TPE331 engine output data reduction results.

The APU was operated at each of the 16 ambient test conditions listed in Table 1. Three consecutive engine load cycles (each cycle defined as the engine loads shown in Table 2) were run and the 240 test data points were catalogued herein, as shown in Table 3.

Similarly, the TPE331 turboprop engine was subjected to 7 engine load conditions (specified in Table 4) and repeated two additional times to comprise 3 consecutive load cycles. Approximately 336 test data points were reduced and catalogued herein, as indicated by Table 5.

All measured emissions data was reduced in the AiResearch CDC 6400 computer using AiResearch-developed emissions data reduction programs. The gaseous emissions and smoke data reduction procedures conform to those outlined in the Federal Register, Volume 38, Number 136.

TABLE 1

AMBIENT TEST CONDITIONS

Test Point	Temperature		Humidity		Barometric Pressure	
	°C	°F	Grams H_2O/ Kilogram Air	Grains H_2O/ Pound Air	mm Hg	inches Hg
1	-7.0	19	1.0	7.0	Hold constant at standard condition, as specified in U.S. Standard Atmosphere, 1962, for test cell altitude.	
2	-7.0	19	2.0	14.0		
3	4.0	39	2.0	14.0		
4	4.0	39	5.0	35.0		
5	15.0	59	2.0	14.0		
6	↓	↓	5.0	35.0		
7			7.5	52.5		
8			10.0	70.0		
9	33.0	91	10.0	70.0		
10	↓	↓	15.0	105.0		
11			20.0	140.0		
12			25.0	175.0	↓	
13	15.0	59	7.5	52.5	580	22.83
14	↓	↓	↓	↓	660	25.98
15					740	29.13
16					500	19.69

TABLE 2

APU Engine Load Conditions
(Corrected to 59°F and 29.92 in. Hg abs)

Condition	Load	Horsepower		
		Shaft	Bleed-Air	Total
1	Idle	-	-	-
2	Pure Shaft Power	79.5	0	79.5
3	Rated Power	198.6	0	198.6
4	Pure Bleed	-	245.0	245.0
5	Combination	45.7	214.3	260.0

TABLE 3

TEST DATA POINT/CYCLES

Test Point (Table 1)	Data Tests		
	Cycle 1	Cycle 2	Cycle 3
1	1 - Cond 1*	6 - Cond 1	11 - Cond 1
	2 - Cond 2*	7 - Cond 2	12 - Cond 2
	3 - Cond 3*	8 - Cond 3	13 - Cond 3
	4 - Cond 4*	9 - Cond 5	14 - Cond 4
	5 - Cond 5*	10 - Cond 5	15 - Cond 5
2	16 - Cond 1	21 - Cond 1	26 - Cond 1
	17 - Cond 2	22 - Cond 2	27 - Cond 2
	18 - Cond 3	23 - Cond 3	28 - Cond 3
	19 - Cond 4	24 - Cond 4	29 - Cond 4
	20 - Cond 5	25 - Cond 5	30 - Cond 5
3	31 - 35	36 - 40	41 - 45
4	46 - 50	51 - 55	56 - 60
5	61 - 65	66 - 70	71 - 75
6	76 - 80	81 - 85	86 - 90
7	91 - 95	96 - 100	101 - 105
8	106 - 110	111 - 115	116 - 120
9	121 - 125	126 - 130	131 - 135
10	136 - 140	141 - 145	146 - 150
11	151 - 155	156 - 160	161 - 165
12	166 - 170	171 - 175	176 - 180
13	181 - 185	186 - 190	191 - 195
14	196 - 200	201 - 205	206 - 210
15	211 - 215	216 - 220	221 - 225
16	226 - Cond 1	231 - Cond 1	236 - Cond 1
	227 - Cond 2	232 - Cond 2	237 - Cond 2
	228 - Cond 3	233 - Cond 3	238 - Cond 3
	229 - Cond 4	234 - Cond 4	239 - Cond 4
	230 - Cond 5	235 - Cond 5	240 - Cond 5

*Conditions 1 through 5 of Table 2

TABLE 4

TPE 331 ENGINE LOAD CONDITIONS
(Corrected to 59°F and 29.92 in. Hg abs)

Condition	Load	Percent of Rated Power	Corrected Total Shaft Horsepower
1*	(Taxi) Idle	5	42
2*	1.5 x Idle	7.5	63
3*	2.0 x Idle	10.0	84
4	Approach	30.0	252
5	Cruise	70.0	588
6	Climb-Out	90.0	756
7 **	Takeoff	100.0	840

*Engine operation on primary fuel atomizers only.

**A derated takeoff load of 706 shp/$\sqrt{\theta}\delta$ was necessary to protect the engine from turbine interstage overtemperature.

TABLE 5

TEST DATA POINT/CYCLES

Test Point (Table 1)	Data Tests		
	Cycle 1	Cycle 2	Cycle 3
1	1 - Cond 1*	8 - Cond 1	15 - Cond 1
	2 - Cond 2*	9 - Cond 2	16 - Cond 2
	3 - Cond 3*	10 - Cond 3	17 - Cond 3
	4 - Cond 4*	11 - Cond 4	18 - Cond 4
	5 - Cond 5*	12 - Cond 5	19 - Cond 5
	6 - Cond 6*	13 - Cond 6	20 - Cond 6
	7 - Cond 7*	14 - Cond 7	21 - Cond 7
2	22 - 28	29 - 35	36 - 42
3	43 - 49	50 - 56	57 - 63
4	64 - 70	71 - 77	78 - 84
5	885 - 91	92 - 98	99 - 105
6	106 - 112	113 - 119	120 - 126
7	127 - 133	134 - 140	141 - 147
8	148 - 154	155 - 161	162 - 168
9	169 - 175	176 - 182	183 - 189
10	190 - 196	197 - 203	204 - 210
11	211 - 217	218 - 224	225 - 231
12	232 - 238	239 - 245	246 - 252
13	253 - 259	260 - 266	267 - 273
14	274 - 280	281 - 287	288 - 294
15	295 - 301	302 - 308	309 - 315
16	316 - 322	323 - 329	330 - 336

*Conditions 1 through 7 of Table 4

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-17-75

MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1

MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT

FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********

********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.853	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	19.787	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.903	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE

ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.

ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 1 DATE: 6-17-75 TIME: 9.05 BARO. PRESS.: 28.478 IN. HGA.

AMBIENT AIR TEMP.: 19.8 DEG. F RELATIVE HUMIDITY: 43.00 PERCENT SPECIFIC HUMIDITY: .001808 LB. H2O/LB. DRY AIR

AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV

SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	1	2	3	4	5
POWER SETTING, CORRECTED HP.	0.00	79.52	197.79	0.00	45.60
N1 SPEED, RPM	41610.00	41470.00	41150.00	41070.00	41000.00
FUEL FLOW (MEAS.) LB./HR.	142.00	175.00	236.00	252.00	250.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.13	5.76	5.44	7.09	6.94
COMPRESSOR INLET TEMP., DEG. F	20.0	21.0	21.0	20.0	21.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.86	61.13	60.15	56.37	58.18
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	364.00	369.00	378.00	339.00	341.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.89
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	55.14	56.96
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	359.00	361.00
ENGINE EXHAUST GAS TEMP., DEG. F	470.0	570.0	792.0	870.0	870.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	130.500	88.500	24.600	39.000	22.500
CARBON MONOXIDE (CO), PPMV	249.616	282.571	285.169	410.646	298.384
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.000	22.900	36.500	42.000	45.800
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.306	1.729	2.496	2.918	2.957
NITRIC OXIDE (NO), PPMV	10.500	17.000	37.000	39.300	42.200
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	11.139	5.749	1.116	1.518	.864
CARBON MONOXIDE (CO)	37.278	32.112	22.634	27.824	28.032
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.925	4.275	5.819	4.675	4.964
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.582	1.886	.263	.381	.223
CARBON MONOXIDE (CO)	5.293	5.628	5.342	7.012	5.168
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.557	.748	1.165	1.178	1.281
ENGINE WORK OUTPUT, MEAS. SHP	0.00	72.84	181.18	0.00	41.77
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	244.54	219.42
ENGINE WORK OUTPUT, TOTAL HP	0.00	72.84	181.18	244.54	261.19
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.15	98.74	99.37	99.21	99.45
F/A (EMISSIONS)	.006	.008	.012	.014	.014

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 636168-3 TEST DATE 6-17-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEN PT,F= 8.
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0
FUEL=AV. KERO. P BARO= 28.47
REL HUM= 49.00 SPEC HUM= .001000
FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	1	2	3	4	5
PERCENT MAX. CORRECTED POWER	0.0	39.6	98.9	0.0	22.8
CORRECTED SHAFT HP	0.0	79.5	197.8	0.0	45.6
MEASURED SHAFT HP	0.0	72.8	181.2	0.0	41.8
EXHAUST GAS TEMP., DEG.F	470.0	570.0	792.0	870.0	870.0
SHAFT SPEED, N1, RPM	41618.0	41470.0	41150.0	41070.0	41088.0
COMPRESSOR DSCHG. PRES.,PSIA	60.9	61.1	60.1	56.4	58.2
COMPRESSOR DSCHG. TEMP,DEG F	364.0	369.0	378.0	339.0	341.0
EXHAUST GAS PRESS., PSIA	13.54	13.60	13.74	13.71	13.72
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.138	1.915
COMPRESSOR MAP FLOW,LB/SEC	6.03	5.57	5.17	6.77	6.73
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0127	.0150	.0148
CORRECTED FUEL FLOW , LB/HR	142.0	175.0	236.0	252.0	256.0
FA RATIO CALC. FROM EMISSION	.0064	.0084	.0120	.0141	.0142
EQUIVALENCE RATIO	.094	.124	.177	.206	.208
LOADING W/F**N/V/E(T/548)	.396	.361	.338	.367	.360
COMB EFFIC FROM EMISSIONS	98.146	98.740	99.370	99.213	99.453

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.73	2.58	2.92	2.96
LB. CO2 PER LB. OF FUEL	3.06	3.09	3.12	3.11	3.12
WEIGHT FLOW, LB./HR.	435.2	540.4	735.2	782.8	805.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	249.6	282.6	295.2	418.6	298.3
LB. PER 1000 LB. OF FUEL	37.278	32.112	22.634	27.824	20.032
WEIGHT FLOW, LB./HR.	5.293	5.620	5.342	7.012	5.160
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	138.5	88.5	24.6	39.0	22.5
LB. PER 1000 LB. OF FUEL	11.139	5.749	1.116	1.510	.864
WEIGHT FLOW, LB./HR.	1.582	1.086	.263	.381	.223
RATIO LB HC/LB CO	.2988	.1790	.0493	.0543	.0431
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	18.5	17.8	37.0	39.3	42.2
LB. PER 1000 LB. OF FUEL	2.576	3.173	4.824	4.374	4.655
WEIGHT FLOW, LB./HR.	.366	.555	1.138	1.102	1.201
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	5.5	5.9	1.5	2.7	2.8
LB. PER 1000 LB. OF FUEL	1.349	1.101	.196	.301	.309
WEIGHT FLOW, LB./HR.	.192	.193	.046	.076	.080
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.0	22.9	38.5	42.0	45.0
LB. PER 1000 LB. OF FUEL	3.925	4.275	5.013	4.675	4.964
WEIGHT FLOW, LB./HR.	.557	.748	1.185	1.178	1.281
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00694	.00695	.00693	.00695	.00694
SMOKE NUMBER	25.80	26.20	26.20	36.90	25.80
CORRECTED WEIGHT FLOW	.02083	.02086	.02085	.02083	.02082
SMOKE NUMBER	48.50	42.90	41.70	53.60	45.20
CORRECTED WEIGHT FLOW	.03478	.03477	.03473	.03478	.03467
SMOKE NUMBER	46.40	50.00	50.00	66.70	51.20
CORRECTED WEIGHT FLOW	.04866	.04866	.04861	.04859	.04852
SMOKE NUMBER	54.60	57.10	57.10	71.40	59.50
SMOKE NUMBER AT WA=0.823	42.20	44.60	44.30	57.00	45.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-17-75 FUEL=AV. KERO. P BARO= 28.47

DATA POINT NUMBER	1	2	3	4	5
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.293	5.620	5.342	7.012	5.168
UNBURNED HYDROCARBONS	1.582	1.086	.263	.381	.223
OXIDES OF NITROGEN	.557	.748	1.185	1.178	1.281
NITRIC OXIDE	.366	.595	1.136	1.182	1.281
POWER LEVEL HP	0.00	72.84	181.18	244.54	261.19
TOTAL CORRECTED HORSEPOWER	0.00	79.52	197.79	247.15	267.59
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	77.148	29.482	28.673	19.787
UNBURNED HYDROCARBONS	0.000	13.611	1.454	1.556	.853
OXIDES OF NITROGEN	0.000	10.278	6.538	4.817	4.903
NITRIC OXIDE	0.000	7.624	6.283	4.507	4.598

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N156 CALC. DATE: 6-17-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (GLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.732	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	20.120	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.963	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 1 DATE: 6-17-75 TIME: 10.15 BARO. PRESS.: 28.470 IN. HGA.
AMBIENT AIR TEMP.: 19.0 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .001008 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 388.03 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	6	7	8	9	10
POWER SETTING, CORRECTED HP.	0.00	79.60	197.74	0.00	45.64
N1 SPEED, RPM	41630.00	41470.00	41140.00	41040.00	40990.00
FUEL FLOW (MEAS.) LB./HR.	140.00	175.00	238.00	258.00	257.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.04	5.68	5.41	7.06	6.89
COMPRESSOR INLET TEMP., DEG. F	21.0	20.0	21.0	20.0	20.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.37	61.28	60.15	56.42	57.94
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	365.00	368.00	377.00	338.00	340.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.89
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	55.14	56.81
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	358.00	360.00
ENGINE EXHAUST GAS TEMP., DEG. F	471.0	571.0	789.0	867.0	870.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	121.500	84.000	25.200	39.000	19.500
CARBON MONOXIDE (CO), PPMV	252.100	281.017	295.657	404.399	386.306
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.500	23.500	39.000	41.500	46.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.386	1.694	2.534	2.918	2.974
NITRIC OXIDE (NO), PPMV	14.000	17.500	36.500	69.000	43.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.376	5.569	1.127	1.511	.744
CARBON MONOXIDE (CO)	37.667	32.593	23.126	27.407	20.450
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.058	4.477	5.011	4.620	5.845
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.453	.975	.268	.378	.191
CARBON MONOXIDE (CO)	5.273	5.704	5.504	6.852	5.256
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.567	.784	1.193	1.155	1.296
ENGINE WORK OUTPUT, MEAS. SHP	0.00	72.84	181.14	0.00	41.76
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	244.80	219.45
ENGINE WORK OUTPUT, TOTAL HP	0.00	72.84	181.14	244.80	261.21
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.28	98.74	99.36	99.22	99.45
F/A (EMISSIONS)	.006	.008	.012	.014	.014

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-17-75 FUEL=AV. KERO. P BARO= 28.47
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 8. REL HUM= 49.00 SPEC HUM= .001000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO.L/H= 14.160 SL TIM.S= 6.5000

DATA POINT NUMBER	6	7	8	9	10
PERCENT MAX. CORRECTED POWER	8.0	39.8	98.9	0.0	22.8
CORRECTED SHAFT-HP	0.0	79.6	197.7	0.8	45.6
MEASURED SHAFT HP	0.0	72.8	181.1	0.0	41.8
EXHAUST GAS TEMP., DEG.F	471.0	571.0	789.0	867.0	870.0
SHAFT SPEED, N1, RPM	41630.0	41470.0	41140.0	41040.0	40990.0
COMPRESSOR DSCHG. PRES.,PSIA	61.4	61.3	60.1	56.4	57.9
COMPRESSOR DSCHG. TEMP,DEG F	365.0	368.0	377.0	338.0	340.0
EXHAUST GAS PRESS., PSIA	13.54	13.68	13.72	13.71	13.71
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.147	1.913
COMPRESSOR MAP FLOW,LB/SEC	6.02	5.57	5.20	6.79	6.72
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0127	.0149	.0148
CORRECTED FUEL FLOW , LB/HR	140.0	175.0	238.0	250.0	257.0
FA RATIO CALC. FROM EMISSION	.0064	.0083	.0122	.0141	.0143
EQUIVALENCE RATIO	.034	.121	.179	.206	.209
LOADING W/P**N/V/E(T/540)	.390	.360	.341	.368	.362
COMB EFFIC FROM EMISSIONS	98.204	98.745	99.357	99.223	99.454

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.69	2.53	2.92	2.97
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.11	3.11	3.12
WEIGHT FLOW, LB./HR.	429.3	540.3	741.3	776.7	801.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	252.1	281.8	295.7	484.4	386.3
LB. PER 1000 LB. OF FUEL	37.667	32.593	23.126	27.407	20.458
WEIGHT FLOW, LB./HR.	5.273	5.704	5.504	6.852	5.256
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	121.5	84.0	25.2	39.0	19.5
LB. PER 1000 LB. OF FUEL	10.376	5.569	1.127	1.511	.744
WEIGHT FLOW, LB./HR.	1.453	.975	.268	.378	.191
RATIO LB HC/LB CO	.2755	.1709	.0487	.0551	.0364
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	14.0	17.5	36.5	89.0	43.8
LB. PER 1000 LB. OF FUEL	3.436	3.334	4.690	9.908	4.716
WEIGHT FLOW, LB./HR.	.481	.583	1.116	2.477	1.212
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.5	6.0	2.5	-47.5	3.0
LB. PER 1000 LB. OF FUEL	.614	1.143	.321	-5.288	.329
WEIGHT FLOW, LB./HR.	.086	.200	.076	-1.322	.085
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.5	23.5	39.0	41.5	46.8
LB. PER 1000 LB. OF FUEL	4.050	4.477	5.011	4.620	5.045
WEIGHT FLOW, LB./HR.	.567	.784	1.193	1.155	1.296
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00693	.00693	.00695	.00696	.00697
SMOKE NUMBER	25.00	29.80	27.40	35.70	28.60
CORRECTED WEIGHT FLOW	.02079	.02079	.02084	.02091	.02095
SMOKE NUMBER	39.30	44.00	42.90	54.80	42.90
CORRECTED WEIGHT FLOW	.03464	.03461	.03472	.03483	.03490
SMOKE NUMBER	51.20	51.20	52.40	66.70	53.60
CORRECTED WEIGHT FLOW	.04848	.04845	.04859	.04875	.04885
SMOKE NUMBER	57.10	57.10	59.50	73.80	59.50
SMOKE NUMBER AT WA=0.023	43.80	46.00	46.10	58.30	46.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-17-75 FUEL=AV. KERO. P BARO= 28.47

DATA POINT NUMBER	6	7	8	9	10
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.273	5.784	5.504	6.852	5.256
UNBURNED HYDROCARBONS	1.453	.975	.268	.378	.191
OXIDES OF NITROGEN	.567	.784	1.193	1.155	1.296
NITRIC OXIDE	.481	.583	1.116	2.477	1.212
POWER LEVEL HP	0.00	72.84	181.14	244.88	261.21
TOTAL CORRECTED HORSEPOWER	0.00	79.60	197.74	267.41	287.43
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	78.384	30.385	27.988	20.128
UNBURNED HYDROCARBONS	0.000	13.379	1.480	1.543	.732
OXIDES OF NITROGEN	0.000	10.756	6.584	4.718	4.963
NITRIC OXIDE	0.000	8.010	6.162	10.118	4.640

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-17-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.735	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	28.287	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.974	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 691898-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 1 DATE: 6-17-75 TIME: BARO. PRESS.: 28.470 IN. HGA.
AMBIENT AIR TEMP.: 19.0 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .001000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	11	12	13	14	15
POWER SETTING, CORRECTED HP.	0.00	79.75	198.11	0.00	45.66
N1 SPEED, RPM	41620.00	41460.00	41130.00	41020.00	40970.00
FUEL FLOW (MEAS.) LB./HR.	140.00	174.00	237.00	258.00	258.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.04	5.91	5.45	7.07	6.89
COMPRESSOR INLET TEMP., DEG. F	21.0	18.0	19.0	21.0	19.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.47	61.62	60.20	56.32	58.09
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	365.00	366.00	376.00	339.00	338.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.89
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	55.14	56.81
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	359.00	358.00
ENGINE EXHAUST GAS TEMP., DEG. F	469.0	565.0	787.0	868.0	866.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	121.500	82.500	24.000	39.000	19.500
CARBON MONOXIDE (CO), PPMV	254.593	272.273	295.657	410.646	306.306
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.000	23.500	39.500	42.800	45.900
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.306	1.677	2.503	2.906	2.986
NITRIC OXIDE (NO), PPMV	14.000	17.000	36.000	39.000	42.900
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.374	5.528	1.086	1.516	.741
CARBON MONOXIDE (CO)	38.032	31.920	23.410	27.930	20.373
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.172	4.525	5.137	4.782	5.015
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.452	.962	.257	.379	.191
CARBON MONOXIDE (CO)	5.325	5.554	5.548	6.982	5.256
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.584	.787	1.218	1.195	1.294
ENGINE WORK OUTPUT, MEAS. SHP	0.00	72.82	181.09	0.00	41.74
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	244.32	218.37
ENGINE WORK OUTPUT, TOTAL HP	0.00	72.82	181.09	244.32	260.11
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.28	98.76	99.35	99.21	99.46
F/A (EMISSIONS)	.006	.008	.012	.014	.014

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 691898-3 TEST DATE 6-17-75
RAT SHP= 230. RA EGT,F= 1150. RAT SPD= 41600. OEM PT,F= 8.
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0
FUEL=AV. KERO. P BARO= 28.47
REL HUM= 49.00 SPEC HUM= .001000
FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	11	12	13	14	15
PERCENT MAX. CORRECTED POWER	0.0	39.9	99.1	0.0	22.8
CORRECTED SHAFT HP	0.0	79.7	198.1	0.0	45.7
MEASURED SHAFT HP	0.0	72.8	181.1	0.0	41.7
EXHAUST GAS TEMP., DEG.F	469.0	565.0	787.0	868.0	868.0
SHAFT SPEED, N1, RPM	41620.0	41460.0	41130.0	41020.0	40970.0
COMPRESSOR DSCHG. PRES.,PSIA	61.5	61.6	60.2	56.3	58.1
COMPRESSOR DSCHG. TEMP,DEG F	365.0	366.0	376.0	339.0	338.0
EXHAUST GAS PRESS., PSIA	13.54	13.69	13.72	13.71	13.72
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.145	1.907
COMPRESSOR MAP FLOW,LB/SEC	5.98	5.57	5.67	6.84	6.74
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0116	.0147	.0148
CORRECTED FUEL FLOW , LB/HR	140.0	174.0	237.0	250.0	256.0
FA RATIO CALC. FROM EMISSION	.0064	.0082	.0121	.0140	.0143
EQUIVALENCE RATIO	.094	.120	.177	.206	.210
LOADING W/P**N/V/E(T/540)	.386	.357	.372	.373	.364
COMB EFFIC FROM EMISSIONS	98.195	98.764	99.354	99.218	99.456

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.68	2.50	2.91	2.99
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.11	3.11	3.12
WEIGHT FLOW, LB./HR.	429.2	537.4	738.1	776.5	885.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	254.6	272.3	295.7	418.6	386.3
LB. PER 1000 LB. OF FUEL	38.032	31.928	23.410	27.938	20.373
WEIGHT FLOW, LB./HR.	5.325	5.554	5.548	6.982	5.256
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	121.5	82.5	24.8	39.8	19.5
LB. PER 1000 LB. OF FUEL	18.374	5.528	1.886	1.516	.741
WEIGHT FLOW, LB./HR.	1.452	.962	.257	.379	.191
RATIO LB HC/LB CO	.2728	.1732	.0464	.0543	.0364
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	14.0	17.0	36.0	39.0	42.9
LB. PER 1000 LB. OF FUEL	3.435	3.274	4.682	4.357	4.687
WEIGHT FLOW, LB./HR.	.481	.570	1.110	1.089	1.209
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.0	6.5	3.5	3.8	3.8
LB. PER 1000 LB. OF FUEL	.736	1.252	.455	.425	.328
WEIGHT FLOW, LB./HR.	.103	.216	.108	.106	.085
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.0	23.5	39.5	42.8	45.9
LB. PER 1000 LB. OF FUEL	4.172	4.525	5.137	4.782	5.015
WEIGHT FLOW, LB./HR.	.584	.787	1.218	1.195	1.294
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00698	.00699	.00699	.00699	.00697
SMOKE NUMBER	26.20	27.40	26.20	38.10	28.60
CORRECTED WEIGHT FLOW	.02097	.02097	.02097	.02095	.02091
SMOKE NUMBER	41.70	41.70	42.90	57.10	46.40
CORRECTED WEIGHT FLOW	.03495	.03492	.03492	.03490	.03484
SMOKE NUMBER	48.80	52.40	51.20	66.70	57.10
CORRECTED WEIGHT FLOW	.04892	.04883	.04888	.04883	.04876
SMOKE NUMBER	56.00	58.30	57.10	75.00	61.90
SMOKE NUMBER AT WA=0.023	43.60	45.40	44.80	59.80	49.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

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*************************************** AIRESEARCH EMISSION TEST SUMMARY ***************************************
  ENGINE= GTCP85-98CK      S/N= 36179     COMB P/N= 691898-3 TEST DATE  6-17-75      FUEL=AV. KERO.    P BARO= 28.47
DATA POINT NUMBER                   11        12        13        14        15
EMISSION RATE LB/HR
    CARBON MONOXIDE               5.325     5.554     5.548     6.982     5.256
    UNBURNED HYDROCARBONS         1.452      .962      .257      .379      .191
    OXIDES OF NITROGEN             .584      .787     1.218     1.195     1.294
    NITRIC OXIDE                   .481      .570     1.110     1.089     1.209
POWER LEVEL HP                    0.00     72.82    181.09    244.32    260.11
TOTAL CORRECTED HORSEPOWER        0.00     79.75    198.11    247.18    266.13
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR
    CARBON MONOXIDE               0.000    76.266    30.637    28.579    20.207
    UNBURNED HYDROCARBONS         0.000    13.209     1.421     1.551      .735
    OXIDES OF NITROGEN            0.000    10.813     6.723     4.893     4.974
    NITRIC OXIDE                  0.000     7.822     6.128     4.458     4.649
    NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION
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ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-17-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB. ADDITIVES: NONE

FUEL: ASTM D1655-73

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.873	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	20.984	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.809	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CJ IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
MODEL NO.: USER:
AIRCRAFT INSTALLATION *** MFR.:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 2 DATE: 6-17-75 TIME: 13.45 BARO. PRESS.: 28.470 IN. HGA.
AMBIENT AIR TEMP.: 19.0 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .002008 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

	16	17	18	19	20
TEST CONDITION	0.00	79.46	197.65	0.00	45.54
POWER SETTING, CORRECTED HP.	41600.00	-1440.00	41120.00	41000.00	40958.00
N1 SPEED, RPM	142.00	175.00	232.00	250.00	250.00
FUEL FLOW (MEAS.) LB./HR.	6.98	5.68	5.31	7.01	7.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	18.0	21.0	21.0	19.0	21.0
COMPRESSOR INLET TEMP., DEG. F	62.36	61.37	60.15	56.07	57.69
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	362.00	368.00	376.00	335.00	339.00
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	0.00	0.00	0.00	2.17	1.89
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	54.75	56.56
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	355.00	358.00
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	861.0	861.0
ENGINE EXHAUST GAS TEMP., DEG. F	467.0	571.0	775.0		
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	121.500	76.500	13.500	33.000	22.500
CARBON MONOXIDE (CO), PPMV	252.100	274.634	207.066	410.646	308.994
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.500	23.300	48.200	43.000	44.900
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.318	1.694	2.529	2.974	2.918
NITRIC OXIDE (NO), PPMV	13.000	17.500	37.700	40.000	41.100
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.282	5.875	.607	1.254	.875
CARBON MONOXIDE (CO)	37.326	31.981	16.294	27.309	21.020
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.813	4.443	5.196	4.697	5.817
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.468	.868	.141	.314	.226
CARBON MONOXIDE (CO)	5.300	5.563	3.760	6.827	5.423
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.578	.777	1.205	1.174	1.294
ENGINE WORK OUTPUT, MEAS. SHP	0.00	72.79	181.05	0.00	41.72
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	248.74	216.72
ENGINE WORK OUTPUT, TOTAL HP	0.00	72.79	181.05	248.74	258.44
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.22	98.80	99.56	99.25	99.43
F/A (EMISSIONS)	.006	.008	.012	.014	.014

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-17-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 19. FUEL=AV. KERO. P BARO= 28.47
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 REL HUM= 100.00 SPEC HUM= .002000
FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	16	17	18	19	20
PERCENT MAX. CORRECTED POWER	0.0	39.7	98.8	0.0	22.8
CORRECTED SHAFT HP	0.0	79.5	197.6	0.0	45.5
MEASURED SHAFT HP	0.0	72.8	181.0	0.0	41.7
EXHAUST GAS TEMP., DEG.F	467.0	571.0	775.0	881.0	861.0
SHAFT SPEED, N1, RPM	41600.0	41440.0	41120.0	41000.0	40950.0
COMPRESSOR DSCHG. PRES.,PSIA	62.4	61.4	60.1	56.1	57.7
COMPRESSOR DSCHG. TEMP,DEG F	362.0	368.8	376.0	335.0	339.8
EXHAUST GAS PRESS., PSIA	13.53	13.59	13.71	13.72	13.72
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.192	1.988
COMPRESSOR MAP FLOW,LB/SEC	6.37	5.57	5.18	6.82	6.67
FA RATIO BASED ON MAP FLOW	.0065	.0067	.0125	.0149	.0150
CORRECTED FUEL FLOW , LB/HR	142.0	175.0	232.8	250.0	258.0
FA RATIO CALC. FROM EMISSION	.0065	.0083	.0121	.0143	.0140
EQUIVALENCE RATIO	.095	.121	.178	.210	.206
LOADING W/P**N/V/E(T/540)	.384	.359	.340	.372	.362
COMB EFFIC FROM EMISSIONS	98.220	98.804	99.563	99.248	99.429

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.32	1.69	2.53	2.97	2.92
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.11	3.12
WEIGHT FLOW, LB./HR.	435.5	540.7	725.4	776.9	804.6
CARBON MONOXIDE					
PPM BY VOLUME, WET	252.1	274.8	207.1	418.6	309.0
LB. PER 1000 LB. OF FUEL	37.326	31.901	16.294	27.309	21.028
WEIGHT FLOW, LB./HR.	5.300	5.583	3.780	6.827	5.423
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	121.5	76.5	13.5	33.0	22.5
LB. PER 1000 LB. OF FUEL	18.282	5.075	.687	1.254	.875
WEIGHT FLOW, LB./HR.	1.460	.868	.141	.314	.226
RATIO LB HC/LB CO	.2755	.1591	.0373	.0459	.0416
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.8	17.5	37.7	40.0	41.1
LB. PER 1000 LB. OF FUEL	3.162	3.337	4.673	4.369	4.593
WEIGHT FLOW, LB./HR.	.449	.584	1.130	1.092	1.185
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.5	5.8	2.5	3.0	3.8
LB. PER 1000 LB. OF FUEL	.851	1.106	.323	.328	.425
WEIGHT FLOW, LB./HR.	.121	.194	.075	.082	.110
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.5	23.3	40.2	43.0	44.9
LB. PER 1000 LB. OF FUEL	4.013	4.443	5.196	4.697	5.017
WEIGHT FLOW, LB./HR.	.570	.777	1.205	1.174	1.294
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00698	.00695	.00697	.00696	.00695
SMOKE NUMBER	22.60	26.20	15.50	31.00	25.00
CORRECTED WEIGHT FLOW	.02089	.02086	.02089	.02087	.02084
SMOKE NUMBER	38.10	38.10	28.60	54.00	48.50
CORRECTED WEIGHT FLOW	.03482	.03474	.03479	.03477	.03472
SMOKE NUMBER	46.40	48.80	39.30	60.70	52.40
CORRECTED WEIGHT FLOW	.04872	.04862	.04870	.04865	.04859
SMOKE NUMBER	51.20	54.80	48.80	72.60	58.30
SMOKE NUMBER AT WA=0.023	40.00	42.40	33.60	55.40	44.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

FUEL=AV. KERO. P BARO= 28.47

ENGINE= GTCP85-98CK	S/N= 36179	COMB P/N= 698168-3	TEST DATE 6-17-75		
DATA POINT NUMBER	16	17	18	19	20
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.388	5.503	3.768	6.827	5.423
UNBURNED HYDROCARBONS	1.468	.888	.141	.314	.226
OXIDES OF NITROGEN	.570	.777	1.285	1.174	1.294
NITRIC OXIDE	.449	.584	1.130	1.092	1.185
POWER LEVEL HP	0.00	72.79	161.85	248.74	258.44
TOTAL CORRECTED HORSEPOWER	0.00	79.46	197.65	251.13	264.68
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	76.698	20.888	27.447	20.984
UNBURNED HYDROCARBONS	0.000	12.283	.778	1.261	.873
OXIDES OF NITROGEN	0.000	10.681	6.658	4.721	5.009
NITRIC OXIDE	0.000	8.022	6.244	4.392	4.585

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-17-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.742	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	21.117	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.864	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 2 DATE: 6-17-75 TIME: 14.45 BARO. PRESS.: 28.478 IN. HGA.
AMBIENT AIR TEMP.: 19.0 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .002088 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	21	22	23	24	25
POWER SETTING, CORRECTED HP.	0.00	79.55	198.87	0.00	45.56
N1 SPEED, RPM	41600.00	41440.00	41080.00	40980.00	40940.00
FUEL FLOW (MEAS.) LB./HR.	140.00	174.00	235.00	256.00	258.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.11	5.95	5.58	7.13	6.98
COMPRESSOR INLET TEMP., DEG. F	21.0	20.0	18.0	18.0	20.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.87	61.37	60.64	56.87	57.59
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	364.00	366.00	372.00	332.00	338.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.16	1.86
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	54.99	56.37
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	352.00	358.00
ENGINE EXHAUST GAS TEMP., DEG. F	464.0	567.0	780.0	879.0	860.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	115.500	77.400	12.000	31.500	19.500
CARBON MONOXIDE (CO), PPMV	244.671	273.808	206.143	410.646	317.124
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.000	23.200	40.000	43.500	46.300
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.294	1.664	2.472	2.980	2.974
NITRIC OXIDE (NO), PPMV	13.500	16.500	37.200	40.500	42.900
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.965	5.227	.552	1.195	.744
CARBON MONOXIDE (CO)	36.930	32.353	16.590	27.259	21.164
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.215	4.503	5.288	4.743	5.076
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.395	.910	.130	.386	.192
CARBON MONOXIDE (CO)	5.170	5.629	3.899	6.978	5.460
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.590	.784	1.243	1.214	1.310
ENGINE WORK OUTPUT, MEAS. SHP	0.00	72.79	188.87	0.00	41.71
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	247.78	216.87
ENGINE WORK OUTPUT, TOTAL HP	0.00	72.79	188.87	247.78	258.58
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.26	98.78	99.56	99.25	99.44
F/A (EMISSIONS)	.006	.008	.012	.014	.014

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-17-75
RAT SHP= 280. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 19. FUEL=AV. KERO. P BARO= 28.47
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LN T,F= 388.8 REL HUM= 100.00 SPEC HUM= .002888
FLO,L/M= 14.160 SL TIM,S= 6.5888

DATA POINT NUMBER	21	22	23	24	25
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.0	0.0	22.8
CORRECTED SHAFT HP	0.0	79.5	198.1	0.0	45.6
MEASURED SHAFT HP	0.0	72.8	180.9	0.0	41.7
EXHAUST GAS TEMP., DEG.F	464.0	567.0	780.8	879.8	868.8
SHAFT SPEED, N1, RPM	41688.0	41440.8	41080.0	40980.0	40940.8
COMPRESSOR DSCHG. PRES.,PSIA	61.9	61.4	60.6	56.1	57.6
COMPRESSOR DSCHG. TEMP,DEG F	364.0	366.0	372.8	332.8	330.8
EXHAUST GAS PRESS., PSIA	13.54	13.60	13.73	13.71	13.72
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.194	1.982
COMPRESSOR MAP FLOW,LB/SEC	6.82	5.57	5.25	6.77	6.77
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0124	.0155	.0147
CORRECTED FUEL FLOW , LB/HR	140.0	174.0	235.0	256.0	258.0
FA RATIO CALC. FROM EMISSION	.0064	.0081	.0119	.0144	.0143
EQUIVALENCE RATIO	.093	.119	.174	.211	.209
LOADING W/P**N/V/E(T/540)	.385	.360	.343	.378	.372
COMB EFFIC FROM EMISSIONS	98.257	98.780	99.561	99.254	99.437

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.29	1.66	2.47	2.98	2.97
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.11	3.12
WEIGHT FLOW, LB./HR.	429.6	537.5	734.7	795.6	804.6
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.7	273.8	206.1	418.6	317.1
LB. PER 1000 LB. OF FUEL	36.930	32.353	16.598	27.259	21.164
WEIGHT FLOW, LB./HR.	5.178	5.629	3.899	6.978	5.468
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	115.5	77.4	12.8	31.5	19.5
LB. PER 1000 LB. OF FUEL	9.965	5.227	.552	1.195	.744
WEIGHT FLOW, LB./HR.	1.395	.918	.138	.306	.192
RATIO LB HC/LB CO	.2698	.1616	.0333	.0438	.0351
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.5	16.5	37.2	48.5	42.9
LB. PER 1000 LB. OF FUEL	3.347	3.282	4.918	4.616	4.788
WEIGHT FLOW, LB./HR.	.469	.557	1.156	1.131	1.213
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.5	6.7	2.8	3.8	3.4
LB. PER 1000 LB. OF FUEL	.868	1.388	.378	.327	.373
WEIGHT FLOW, LB./HR.	.121	.226	.087	.084	.096
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.0	23.2	40.0	43.5	46.3
LB. PER 1000 LB. OF FUEL	4.215	4.583	5.288	4.743	5.076
WEIGHT FLOW, LB./HR.	.590	.784	1.243	1.214	1.310
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08695	.08694	.08694	.08693	.08694
SMOKE NUMBER	22.68	28.68	19.88	53.68	29.88
CORRECTED WEIGHT FLOW	.02885	.02882	.02881	.02879	.02888
SMOKE NUMBER	36.98	48.58	33.38	59.58	41.78
CORRECTED WEIGHT FLOW	.03476	.03468	.03467	.03464	.03464
SMOKE NUMBER	46.48	47.68	48.58	67.98	52.48
CORRECTED WEIGHT FLOW	.04864	.04853	.04852	.04847	.04847
SMOKE NUMBER	47.68	52.48	53.68	71.48	61.98
SMOKE NUMBER AT WA=0.823	38.88	42.78	37.28	63.48	47.88

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-17-75 FUEL=AV. KERO. P BARO= 28.47

DATA POINT NUMBER	21	22	23	24	25
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.178	5.629	3.899	6.978	5.468
UNBURNED HYDROCARBONS	1.395	.918	.138	.386	.192
OXIDES OF NITROGEN	.598	.784	1.243	1.214	1.318
NITRIC OXIDE	.469	.557	1.156	1.131	1.213
POWER LEVEL HP	0.00	72.79	180.87	247.78	258.58
TOTAL CORRECTED HORSEPOWER	0.00	79.55	198.07	249.98	264.76
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	77.339	21.555	28.163	21.117
UNBURNED HYDROCARBONS	0.000	12.496	.717	1.235	.742
OXIDES OF NITROGEN	0.000	10.764	6.878	4.988	5.064
NITRIC OXIDE	0.000	7.655	6.389	4.562	4.692

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-18-73
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 288. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.885 LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	21.645 LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.960 LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 2 DATE: 6-18-73 TIME: 8.45 BARO. PRESS.: 28.448 IN. HGA.
AMBIENT AIR TEMP.: 19.0 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 388.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

	26	27	28	29	30
TEST CONDITION	0.00	79.61	198.56	0.00	45.79
POWER SETTING, CORRECTED HP.	41660.00	41490.00	41180.00	41080.00	41040.00
N1 SPEED, RPM	142.00	175.00	238.00	256.00	262.00
FUEL FLOW (MEAS.) LB./HR.	6.23	5.91	5.53	7.14	6.99
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	18.0	19.0	19.0	19.0	19.0
COMPRESSOR INLET TEMP., DEG. F	62.85	61.87	60.00	56.71	58.53
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	362.00	367.00	375.00	334.00	338.00
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	0.00	0.00	0.00	2.18	1.98
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	55.50	57.20
BLEED AIR PRESSURE, PSIA	-0.00	-0.00	-0.00	355.00	357.00
BLEED AIR TEMPERATURE, DEG. F	462.0	565.0	774.0	868.0	863.0
ENGINE EXHAUST GAS TEMP., DEG. F					
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	126.000	81.000	12.300	33.000	21.000
CARBON MONOXIDE (CO), PPMV	237.311	277.484	208.502	416.952	322.598
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.000	23.200	39.000	42.300	45.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.286	1.686	2.488	2.974	2.974
NITRIC OXIDE (NO), PPMV	9.500	15.900	35.500	39.000	40.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.935	5.399	.562	1.254	.881
CARBON MONOXIDE (CO)	36.032	32.350	16.675	27.722	21.525
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.998	4.444	5.124	4.628	4.932
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.953	.945	.134	.321	.218
CARBON MONOXIDE (CO)	5.116	5.661	3.969	7.097	5.639
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.567	.778	1.219	1.183	1.292
ENGINE WORK OUTPUT, MEAS. SHP	0.00	72.86	181.31	0.00	41.81
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	249.89	218.73
ENGINE WORK OUTPUT, TOTAL HP	0.00	72.86	181.31	249.89	260.54
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.19	98.77	99.56	99.24	99.42
F/A (EMISSIONS)	.006	.008	.012	.014	.014

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-18-73 FUEL=AV. KERO. P BARO= 28.44
RAT SHP= 208. RA EGT,F= 1150. RAT SPD= 41680. DEW PT,F= 19. REL HUM= 100.00 SPEC HUM= .002000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 308.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	26	27	28	29	30
PERCENT MAX. CORRECTED POWER	0.0	39.9	99.3	0.0	22.9
CORRECTED SHAFT HP	0.0	79.6	198.6	0.0	45.8
MEASURED SHAFT HP	0.0	72.9	181.3	0.0	41.8
EXHAUST GAS TEMP., DEG.F	462.0	565.0	774.0	868.0	863.0
SHAFT SPEED, N1, RPM	41660.0	41490.0	41180.0	41080.0	41040.0
COMPRESSOR DSCHG. PRES.,PSIA	62.8	61.9	60.9	56.7	58.5
COMPRESSOR DSCHG. TEMP,DEG F	362.0	367.0	375.0	334.0	336.0
EXHAUST GAS PRESS., PSIA	13.52	13.58	13.72	13.78	13.78
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.204	1.918
COMPRESSOR MAP FLOW,LB/SEC	6.87	5.57	5.25	6.87	6.74
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0126	.0152	.0150
CORRECTED FUEL FLOW , LB/HR	142.0	175.0	238.0	256.0	262.0
FA RATIO CALC. FROM EMISSION	.0063	.0082	.0120	.0143	.0143
EQUIVALENCE RATIO	.093	.121	.175	.210	.209
LOADING W/P**N/V/E(T/540)	.379	.354	.338	.369	.358
COMB EFFIC FROM EMISSIONS	98.193	98.765	99.558	99.238	99.423

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.29	1.69	2.49	2.97	2.97
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.11	3.12
WEIGHT FLOW, LB./HR.	439.6	548.5	744.1	795.4	816.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	237.3	277.4	288.5	417.8	322.6
LB. PER 1000 LB. OF FUEL	36.832	32.358	16.675	27.722	21.525
WEIGHT FLOW, LB./HR.	5.116	5.661	3.969	7.097	5.639
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	126.0	81.8	12.3	33.8	21.8
LB. PER 1000 LB. OF FUEL	18.935	5.399	.562	1.254	.881
WEIGHT FLOW, LB./HR.	1.553	.945	.134	.321	.218
RATIO LB HC/LB CO	.3035	.1669	.0337	.0452	.0372
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.5	15.9	35.5	39.8	40.5
LB. PER 1000 LB. OF FUEL	2.369	3.846	4.664	4.259	4.439
WEIGHT FLOW, LB./HR.	.336	.533	1.110	1.090	1.163
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.5	7.3	3.5	3.3	4.5
LB. PER 1000 LB. OF FUEL	1.621	1.398	.468	.360	.493
WEIGHT FLOW, LB./HR.	.230	.245	.189	.092	.129
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.0	23.2	39.0	42.3	45.0
LB. PER 1000 LB. OF FUEL	3.990	4.444	5.124	4.620	4.932
WEIGHT FLOW, LB./HR.	.567	.778	1.219	1.183	1.292
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00706	.00707	.00707	.00705	.00704
SMOKE NUMBER	26.20	27.40	22.60	34.50	27.40
CORRECTED WEIGHT FLOW	.02117	.02121	.02120	.02115	.02111
SMOKE NUMBER	38.10	41.70	40.50	53.60	44.80
CORRECTED WEIGHT FLOW	.03528	.03534	.03532	.03524	.03517
SMOKE NUMBER	48.80	47.60	45.20	63.10	54.80
CORRECTED WEIGHT FLOW	.04938	.04947	.04942	.04931	.04921
SMOKE NUMBER	51.20	56.80	56.80	72.60	63.10
SMOKE NUMBER AT WA=0.823	41.30	43.40	41.30	56.30	47.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-18-73 FUEL=AV. KERO. P BARO= 28.44

DATA POINT NUMBER		26	27	28	29	30
EMISSION RATE LB/HR						
	CARBON MONOXIDE	5.116	5.661	3.969	7.097	5.639
	UNBURNED HYDROCARBONS	1.553	.965	.134	.321	.218
	OXIDES OF NITROGEN	.567	.778	1.219	1.183	1.292
	NITRIC OXIDE	.336	.533	1.118	1.090	1.163
POWER LEVEL HP		0.00	72.68	181.31	249.89	268.54
TOTAL CORRECTED HORSEPOWER		0.00	79.81	198.56	252.55	266.85
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR						
	CARBON MONOXIDE	0.000	77.682	21.889	28.400	21.045
	UNBURNED HYDROCARBONS	0.000	12.965	.738	1.285	.805
	OXIDES OF NITROGEN	0.000	10.672	6.725	4.733	4.960
	NITRIC OXIDE	0.000	7.314	6.122	4.364	4.464

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-13-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 288. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.371	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.889	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.274	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0. HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 3 DATE: 6-13-75 TIME: 10.15 BARO. PRESS.: 28.748 IN. HGA.
AMBIENT AIR TEMP.: 39.0 DEG. F RELATIVE HUMIDITY: 40.00 PERCENT SPECIFIC HUMIDITY: .002888 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	31	32	33	34	35
POWER SETTING, CORRECTED HP.	0.00	79.40	199.86	0.00	45.41
N1 SPEED, RPM	41638.00	41470.00	41160.00	41080.00	41040.00
FUEL FLOW (MEAS.) LB./HR.	140.00	175.00	240.00	250.00	250.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.99	5.74	5.31	6.98	6.86
COMPRESSOR INLET TEMP., DEG. F	39.0	39.0	39.0	38.9	39.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.00	60.39	59.66	55.60	57.05
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	381.00	385.00	395.00	351.00	357.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.84
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	54.35	55.83
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	372.00	377.00
ENGINE EXHAUST GAS TEMP., DEG. F	484.0	596.0	838.0	983.0	912.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	123.000	74.400	9.000	21.000	9.600
CARBON MONOXIDE (CO), PPMV	252.100	288.500	194.435	344.957	264.644
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.900	25.400	43.000	45.500	47.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.316	1.736	2.618	2.974	2.980
NITRIC OXIDE (NO), PPMV	9.000	16.000	39.000	37.500	39.200
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.486	4.813	.391	.888	.366
CARBON MONOXIDE (CO)	37.322	31.747	14.793	22.999	17.665
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.353	4.722	5.374	4.983	5.288
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.467	.842	.094	.288	.094
CARBON MONOXIDE (CO)	5.225	5.556	3.550	5.750	4.550
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.609	.826	1.290	1.246	1.344
ENGINE WORK OUTPUT, MEAS. SHP	0.00	74.78	187.49	0.00	42.77
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	241.67	212.80
ENGINE WORK OUTPUT, TOTAL HP	0.00	74.78	187.49	241.67	254.77
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.21	98.83	99.62	99.39	99.55
F/A (EMISSIONS)	.006	.008	.013	.014	.014

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-13-75 FUEL=AV. KERO. P BARO= 28.74
RAT SHP= 200. RA EGT,F= 1158. RAT SPD= 41600. DEW PT,F= 19. REL HUM= 48.00 SPEC HUM= .002800
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	31	32	33	34	35
PERCENT MAX. CORRECTED POWER	0.0	39.7	99.5	0.0	22.7
CORRECTED SHAFT HP	0.0	79.4	199.1	0.0	45.4
MEASURED SHAFT HP	0.0	74.0	187.5	0.0	42.8
EXHAUST GAS TEMP., DEG.F	484.0	596.0	838.0	983.0	912.0
SHAFT SPEED, N1, RPM	41630.0	41470.0	41160.0	41080.0	41040.0
COMPRESSOR DSCHG. PRES.,PSIA	60.9	60.4	59.7	55.7	57.1
COMPRESSOR DSCHG. TEMP,DEG F	381.0	385.0	395.0	351.0	357.0
EXHAUST GAS PRESS., PSIA	13.66	13.73	13.86	13.85	13.86
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.164	1.078
COMPRESSOR MAP FLOW,LB/SEC	5.95	5.78	5.15	6.74	6.62
FA RATIO BASED ON MAP FLOW	.0065	.0085	.0129	.0150	.0150
CORRECTED FUEL FLOW , LB/HR	148.0	175.0	240.0	258.0	258.0
FA RATIO CALC. FROM EMISSION	.0065	.0085	.0126	.0143	.0143
EQUIVALENCE RATIO	.095	.124	.184	.210	.209
LOADING W/P**N/V/E(T/540)	.379	.365	.331	.364	.357
COMB EFFIC FROM EMISSIONS	98.289	98.831	99.618	99.389	99.552

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.32	1.74	2.62	2.97	2.98
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.12	3.13
WEIGHT FLOW, LB./HR.	429.4	540.9	751.1	776.9	806.3
CARBON MONOXIDE					
PPM BY VOLUME, WET	252.1	280.5	194.4	345.0	264.6
LB. PER 1000 LB. OF FUEL	37.322	31.747	14.793	22.999	17.665
WEIGHT FLOW, LB./HR.	5.225	5.556	3.550	5.750	4.558
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	123.8	74.4	9.8	21.8	9.6
LB. PER 1000 LB. OF FUEL	18.406	4.813	.391	.888	.366
WEIGHT FLOW, LB./HR.	1.457	.842	.094	.208	.094
RATIO LB HC/LB CO	.2789	.1516	.0265	.0348	.0207
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.8	16.8	39.8	37.5	39.2
LB. PER 1000 LB. OF FUEL	2.189	2.975	4.874	4.187	4.298
WEIGHT FLOW, LB./HR.	.306	.521	1.178	1.027	1.109
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	8.9	9.4	4.8	8.8	8.3
LB. PER 1000 LB. OF FUEL	2.164	1.748	.500	.876	.918
WEIGHT FLOW, LB./HR.	.303	.306	.120	.219	.235
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.9	25.4	43.8	45.5	47.5
LB. PER 1000 LB. OF FUEL	4.353	4.722	5.374	4.983	5.208
WEIGHT FLOW, LB./HR.	.609	.826	1.298	1.246	1.344
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08699	.08698	.08698	.08698	.08788
SMOKE NUMBER	18.18	18.18	15.78	38.18	19.38
CORRECTED WEIGHT FLOW	.02895	.02895	.02894	.02893	.02181
SMOKE NUMBER	31.38	34.38	26.98	45.88	36.18
CORRECTED WEIGHT FLOW	.03475	.03489	.03487	.03486	.03498
SMOKE NUMBER	40.48	43.48	40.48	54.28	45.88
CORRECTED WEIGHT FLOW	.04878	.04883	.04879	.04878	.04898
SMOKE NUMBER	50.68	51.88	48.28	68.18	51.28
SMOKE NUMBER AT WA=8.823	35.68	37.48	33.68	59.18	38.58

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NC, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO, AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-13-75 FUEL=AV. KERO. P BARO= 28.74

DATA POINT NUMBER	31	32	33	34	35
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.225	5.556	3.550	5.750	4.558
UNBURNED HYDROCARBONS	1.457	.842	.894	.288	.894
OXIDES OF NITROGEN	.689	.826	1.298	1.246	1.344
NITRIC OXIDE	.386	.521	1.178	1.027	1.189
POWER LEVEL HP	0.00	74.78	187.49	241.67	254.77
TOTAL CORRECTED HORSEPOWER	0.00	79.40	199.06	246.45	261.82
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	74.291	18.936	23.792	17.889
UNBURNED HYDROCARBONS	0.000	11.263	.501	.828	.371
OXIDES OF NITROGEN	0.000	11.050	6.879	5.155	5.274
NITRIC OXIDE	0.000	6.961	6.239	4.249	4.353

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-13-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: Z
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.455	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.648	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.334	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0. HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 3 DATE: 6-13-75 TIME: 12.45 BARO. PRESS.: 28.740 IN. HGA.
AMBIENT AIR TEMP.: 39.0 DEG. F RELATIVE HUMIDITY: 40.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	36	37	38	39	40
POWER SETTING, CORRECTED HP.	0.00	79.28	199.12	0.00	45.37
N1 SPEED, RPM	41630.00	41450.00	41130.00	41060.00	41000.00
FUEL FLOW (MEAS.) LB./HR.	139.00	175.00	238.00	252.00	256.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.95	5.77	5.24	6.97	6.76
COMPRESSOR INLET TEMP., DEG. F	40.0	40.0	38.0	38.0	39.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.39	60.15	59.66	55.38	56.61
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	382.00	387.00	394.00	353.00	357.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.84
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	54.11	55.63
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	373.00	377.00
ENGINE EXHAUST GAS TEMP., DEG. F	485.0	595.0	831.0	983.0	989.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	120.000	73.500	9.000	21.000	12.000
CARBON MONOXIDE (CO), PPMV	252.100	269.212	189.790	350.666	266.164
TOTAL OXIDES OF NITROGEN (NOX), PPMV	18.000	25.000	44.300	45.500	49.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.316	1.729	2.634	3.003	3.014
NITRIC OXIDE (NO), PPMV	9.000	16.200	38.200	38.500	41.300
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.157	4.782	.389	.793	.453
CARBON MONOXIDE (CO)	37.330	30.643	14.356	23.156	17.564
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.378	4.824	5.504	4.935	5.311
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.412	.837	.893	.288	.116
CARBON MONOXIDE (CO)	5.189	5.363	3.417	5.835	4.496
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.609	.844	1.310	1.244	1.360
ENGINE WORK OUTPUT, MEAS. SHP	0.00	74.75	187.35	0.00	42.73
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	242.46	212.17
ENGINE WORK OUTPUT, TOTAL HP	0.00	74.75	187.35	242.46	254.90
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.23	98.86	99.63	99.39	99.55
F/A (EMISSIONS)	.006	.008	.013	.014	.014

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-13-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 19. FUEL=AV. KERO. P BARO= 28.76
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 REL HUM= 40.00 SPEC HUM= .002000
FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	36	37	38	39	40
PERCENT MAX. CORRECTED POWER	0.0	39.6	99.6	0.0	22.7
CORRECTED SHAFT HP	0.0	79.3	199.1	0.0	45.4
MEASURED SHAFT HP	0.0	74.7	187.4	0.0	42.7
EXHAUST GAS TEMP., DEG.F	485.0	595.0	831.0	903.0	989.0
SHAFT SPEED, N1, RPM	41630.0	41450.0	41130.0	41060.0	41000.0
COMPRESSOR DSCHG. PRES.,PSIA	60.4	60.1	59.7	55.4	56.8
COMPRESSOR DSCHG. TEMP,DEG F	382.0	387.0	394.0	353.0	357.0
EXHAUST GAS PRESS., PSIA	13.69	13.73	13.86	13.85	13.85
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.164	1.879
COMPRESSOR MAP FLOW,LB/SEC	5.92	5.65	5.08	6.67	6.59
FA RATIO BASED ON MAP FLOW	.0065	.0086	.0138	.0154	.0158
CORRECTED FUEL FLOW , LB/HR	139.0	175.0	238.0	252.0	256.0
FA RATIO CALC. FROM EMISSION	.0065	.0084	.0126	.0144	.0144
EQUIVALENCE RATIO	.095	.124	.185	.212	.212
LOADING W/P**N/V/E(T/540)	.382	.364	.327	.368	.357
COMB EFFIC FROM EMISSIONS	98.231	98.868	99.628	99.386	99.547

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.32	1.73	2.63	3.08	3.81
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.12	3.13
WEIGHT FLOW, LB./HR.	426.4	541.2	745.0	785.1	808.1
CARBON MONOXIDE					
PPM BY VOLUME, WET	252.1	269.2	169.8	350.7	266.2
LB. PER 1000 LB. OF FUEL	37.330	38.643	14.356	23.156	17.564
WEIGHT FLOW, LB./HR.	5.189	5.363	3.417	5.835	4.496
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	128.0	73.5	9.0	21.0	12.0
LB. PER 1000 LB. OF FUEL	18.157	4.782	.369	.793	.453
WEIGHT FLOW, LB./HR.	1.412	.837	.093	.208	.116
RATIO LB HC/LB CO	.2721	.1561	.0271	.0342	.0256
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.8	16.2	38.2	38.5	41.3
LB. PER 1000 LB. OF FUEL	2.189	3.029	4.746	4.176	4.477
WEIGHT FLOW, LB./HR.	.304	.538	1.138	1.052	1.146
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	9.8	9.6	6.1	7.8	7.7
LB. PER 1000 LB. OF FUEL	2.169	1.795	.758	.759	.835
WEIGHT FLOW, LB./HR.	.304	.314	.188	.191	.214
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	18.8	25.8	44.3	45.5	49.0
LB. PER 1000 LB. OF FUEL	4.378	4.824	5.504	4.935	5.311
WEIGHT FLOW, LB./HR.	.689	.844	1.310	1.244	1.360
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00706	.00704	.00704	.00703	.00702
SMOKE NUMBER	16.98	19.38	13.38	31.38	19.38
CORRECTED WEIGHT FLOW	.02118	.02113	.02113	.02109	.02107
SMOKE NUMBER	33.78	33.78	31.38	48.28	34.98
CORRECTED WEIGHT FLOW	.03526	.03521	.03519	.03512	.03510
SMOKE NUMBER	42.28	43.48	39.88	60.28	44.68
CORRECTED WEIGHT FLOW	.04939	.04927	.04925	.04913	.04913
SMOKE NUMBER	48.28	51.28	44.68	69.98	52.48
SMOKE NUMBER AT HA=0.823	35.58	37.28	32.68	52.88	38.28

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-13-75 FUEL=AV. KERO. P BARO= 28.74

DATA POINT NUMBER	36	37	38	39	48
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.189	5.363	3.417	5.835	4.496
UNBURNED HYDROCARBONS	1.412	.837	.093	.288	.116
OXIDES OF NITROGEN	.689	.844	1.318	1.244	1.368
NITRIC OXIDE	.384	.538	1.138	1.852	1.146
POWER LEVEL HP	0.00	74.75	187.35	242.46	254.98
TOTAL CORRECTED HORSEPOWER	0.00	79.28	199.12	247.25	261.95
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	71.741	18.237	24.068	17.648
UNBURNED HYDROCARBONS	0.000	11.195	.494	.824	.455
OXIDES OF NITROGEN	0.000	11.294	6.992	5.130	5.334
NITRIC OXIDE	0.000	7.091	6.829	4.341	4.496

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-13-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.354	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.646	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.345	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0. HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 3 DATE: 6-13-75 TIME: 13.40 BARO. PRESS.: 28.748 IN. HGA.
AMBIENT AIR TEMP.: 39.0 DEG. F RELATIVE HUMIDITY: 40.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	41	42	43	44	45
POWER SETTING, CORRECTED HP.	0.00	79.34	198.67	0.00	45.35
N1 SPEED, RPM	41620.00	41440.00	41120.00	41040.00	40980.00
FUEL FLOW (MEAS.) LB./HR.	138.00	175.00	240.00	250.00	256.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.97	5.80	5.33	6.95	6.77
COMPRESSOR INLET TEMP., DEG. F	39.0	39.0	40.0	48.0	39.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.39	60.15	59.41	54.99	56.56
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	380.00	384.00	395.00	353.00	356.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.84
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	53.62	55.38
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	374.00	376.00
ENGINE EXHAUST GAS TEMP., DEG. F	486.0	595.0	634.0	916.0	921.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	103.500	67.500	7.500	19.500	9.300
CARBON MONOXIDE (CO), PPMV	247.140	274.634	189.798	362.236	264.644
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.700	26.800	44.800	45.500	48.800
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.386	1.721	2.608	2.991	3.006
NITRIC OXIDE (NO), PPMV	11.000	16.000	38.000	38.500	41.300
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	8.854	4.414	.328	.739	.351
CARBON MONOXIDE (CO)	36.989	31.448	14.581	24.883	17.499
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.352	4.848	5.623	4.952	5.388
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.222	.772	.079	.185	.090
CARBON MONOXIDE (CO)	5.104	5.502	3.480	6.081	4.488
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.601	.848	1.349	1.238	1.357
ENGINE WORK OUTPUT, MEAS. SHP	0.00	74.73	187.31	0.00	42.71
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	241.55	211.17
ENGINE WORK OUTPUT, TOTAL HP	0.00	74.73	187.31	241.55	253.88
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.35	98.87	99.63	99.37	99.56
F/A (EMISSIONS)	.006	.008	.013	.014	.014

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 696168-3 TEST DATE 6-13-75
RAT SHF= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 19.
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S .N T,F= 300.0

FUEL=AV. KERO. P BARO= 28.74
REL HUM= 40.00 SPEC HUM= .002000
FLO.L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	41	42	43	44	45
PERCENT MAX. CORRECTED POWER	0.0	39.7	99.3	0.0	22.7
CORRECTED SHAFT HP	0.0	79.3	198.7	0.0	45.3
MEASURED SHAFT HP	0.0	74.7	187.3	0.0	42.7
EXHAUST GAS TEMP., DEG.F	486.0	595.0	834.0	916.0	921.0
SHAFT SPEED, N1, RPM	41620.0	41440.0	41120.0	41040.0	40980.0
COMPRESSOR DSCHG. PRES.,PSIA	60.4	60.1	59.4	55.0	56.6
COMPRESSOR DSCHG. TEMP.,DEG F	388.0	384.0	395.0	353.0	356.0
EXHAUST GAS PRESS., PSIA	13.69	13.74	13.87	13.84	13.85
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.167	1.876
CORRECTED FUEL FLOW , LB/HR	138.0	175.0	240.0	250.0	256.0
FA RATIO CALC. FROM EMISSION	.0064	.0084	.0125	.0144	.0144
EQUIVALENCE RATIO	.094	.123	.183	.211	.211
LOADING W/P**N/V/E(T/540)	0.	.366	.331	.367	.357
COMB EFFIC FROM EMISSIONS	95.353	98.373	99.630	99.371	99.550

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.72	2.61	2.99	3.01
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.11	3.13
WEIGHT FLOW, LB./HR.	423.9	541.2	751.3	778.6	800.2
CARBON MONOXIDE					
PPM BY VOLUME, WET	247.1	274.8	189.8	362.2	264.6
LB. PER 1000 LB. OF FUEL	36.989	31.448	14.581	24.883	17.499
WEIGHT FLOW, LB./HR.	5.104	5.502	3.488	6.801	4.488
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	103.5	67.5	7.5	19.5	9.3
LB. PER 1000 LB. OF FUEL	8.854	4.414	.328	.739	.351
WEIGHT FLOW, LB./HR.	1.222	.772	.079	.185	.090
RATIO LB HC/LB CO	.2394	.1404	.0226	.0308	.0201
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.0	16.0	38.0	38.5	41.3
LB. PER 1000 LB. OF FUEL	2.794	3.087	4.769	4.191	4.486
WEIGHT FLOW, LB./HR.	.373	.526	1.145	1.048	1.148
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.7	9.8	6.8	7.8	7.5
LB. PER 1000 LB. OF FUEL	1.647	1.842	.853	.762	.815
WEIGHT FLOW, LB./HR.	.227	.322	.205	.190	.209
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.7	25.8	44.8	45.5	48.8
LB. PER 1000 LB. OF FUEL	4.352	4.848	5.623	4.952	5.388
WEIGHT FLOW, LB./HR.	.601	.848	1.349	1.238	1.357
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00702	.00702	.00700	.00700	.00700
SMOKE NUMBER	16.30	21.70	21.70	31.30	28.50
CORRECTED WEIGHT FLOW	.02105	.02105	.02101	.02100	.02100
SMOKE NUMBER	36.10	37.30	32.50	51.00	37.30
CORRECTED WEIGHT FLOW	.03506	.03507	.03499	.03497	.03496
SMOKE NUMBER	43.40	45.80	42.20	61.40	46.40
CORRECTED WEIGHT FLOW	.04909	.04909	.04897	.04897	.04898
SMOKE NUMBER	58.60	54.20	46.40	70.50	53.80
SMOKE NUMBER AT MA=0.023	37.80	40.10	36.80	54.30	39.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-13-75 FUEL=AV. KERO. P BARO= 28.74

DATA POINT NUMBER	41	42	43	44	45
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.104	5.502	3.488	6.881	4.488
UNBURNED HYDROCARBONS	1.222	.772	.879	.185	.898
OXIDES OF NITROGEN	.681	.848	1.349	1.238	1.357
NITRIC OXIDE	.373	.526	1.145	1.048	1.148
POWER LEVEL HP	0.00	74.73	187.31	241.55	253.88
TOTAL CORRECTED HORSEPOWER	0.00	79.34	198.67	246.82	260.98
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	73.625	18.588	24.842	17.646
UNBURNED HYDROCARBONS	0.000	10.336	.420	.764	.354
OXIDES OF NITROGEN	0.000	11.353	7.204	5.126	5.345
NITRIC OXIDE	0.000	7.041	6.111	4.337	4.523

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-14-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **

HYDROCARBONS (HC AS CH4)	.334	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	19.179	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.891	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698166-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0. HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 4 DATE: 6-14-75 TIME: 87.45 BARO. PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 39.0 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	46	47	48	49	50
POWER SETTING, CORRECTED HP.	0.00	79.34	198.97	0.00	45.36
N1 SPEED, RPM	41650.00	41510.00	41170.00	41090.00	41040.00
FUEL FLOW (MEAS.) LB./HR.	145.00	178.00	250.00	260.00	265.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.21	5.85	5.46	6.97	6.77
COMPRESSOR INLET TEMP., DEG. F	40.0	40.0	39.0	38.0	39.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	62.46	61.47	60.49	55.48	57.20
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	373.00	377.00	384.00	341.00	345.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.20	1.93
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	54.21	56.07
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	360.00	364.00
ENGINE EXHAUST GAS TEMP., DEG. F	471.0	586.0	832.0	925.0	930.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	121.500	72.000	9.000	15.000	9.000
CARBON MONOXIDE (CO), PPMV	244.671	277.484	196.299	317.124	295.657
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.700	23.200	48.900	45.500	45.900
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.316	1.734	2.655	3.154	3.171
NITRIC OXIDE (NO), PPMV	8.000	14.700	34.500	38.000	39.300
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.288	4.671	.366	.548	.323
CARBON MONOXIDE (CO)	36.246	31.485	14.727	19.976	18.937
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.864	4.325	5.848	4.788	4.727
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.492	.831	.896	.148	.086
CARBON MONOXIDE (CO)	5.256	5.604	3.682	5.194	4.912
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.589	.770	1.268	1.224	1.253
ENGINE WORK OUTPUT, MEAS. SHP	0.00	74.86	187.54	0.00	42.77
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	241.28	213.85
ENGINE WORK OUTPUT, TOTAL HP	0.00	74.86	187.54	241.28	256.12
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.24	98.85	99.62	99.48	99.54
F/A (EMISSIONS)	.006	.008	.013	.015	.015

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-14-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41688. OEM PT,F= 48.
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18478. S AM T,F= 388.8
FUEL=AV. KERO. P BARO= 28.76
REL HUM= 100.00 SPEC HUM= .005000
FLO,L/M= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	46	47	48	49	50
PERCENT MAX. CORRECTED POWER	0.0	39.7	99.5	0.0	22.7
CORRECTED SHAFT HP	0.0	79.3	199.0	0.0	45.4
MEASURED SHAFT HP	0.0	74.9	187.5	0.0	42.8
EXHAUST GAS TEMP., DEG.F	471.0	586.0	832.0	925.0	930.0
SHAFT SPEED, N1, RPM	41650.0	41510.0	41170.0	41090.0	41040.0
COMPRESSOR DSCHG. PRES.,PSIA	62.5	61.5	60.5	55.5	57.2
COMPRESSOR DSCHG. TEMP,DEG F	373.0	377.0	384.0	341.0	345.0
EXHAUST GAS PRESS., PSIA	13.69	13.75	13.88	13.84	13.85
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.239	1.964
COMPRESSOR MAP FLOW,LB/SEC	6.18	5.75	5.17	6.77	6.67
FA RATIO BASED ON MAP FLOW	.0066	.0066	.0134	.0150	.0155
CORRECTED FUEL FLOW , LB/HR	145.0	170.0	258.0	268.0	265.0
FA RATIO CALC. FROM EMISSION	.0065	.0065	.0127	.0151	.0152
EQUIVALENCE RATIO	.095	.124	.187	.222	.223
LOADING W/P**N/V/E(T/548)	.377	.363	.332	.369	.368
COMB EFFIC FROM EMISSIONS	98.245	98.858	99.628	99.483	99.536

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.32	1.73	2.66	3.15	3.17
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.12	3.12
WEIGHT FLOW, LB./HR.	445.0	550.3	782.5	811.5	827.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.7	277.4	196.3	317.1	295.7
LB. PER 1000 LB. OF FUEL	36.246	31.485	14.727	19.976	18.537
WEIGHT FLOW, LB./HR.	5.256	5.684	3.682	5.194	4.912
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	121.5	72.8	9.8	15.8	9.8
LB. PER 1000 LB. OF FUEL	18.288	4.671	.386	.548	.323
WEIGHT FLOW, LB./HR.	1.492	.831	.096	.148	.085
RATIO LB HC/LB CO	.2838	.1684	.0262	.0278	.0174
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	8.8	14.7	34.5	38.8	39.3
LB. PER 1000 LB. OF FUEL	2.141	2.741	4.252	3.932	4.847
WEIGHT FLOW, LB./HR.	.311	.488	1.063	1.022	1.073
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	7.9	8.5	4.4	7.5	6.6
LB. PER 1000 LB. OF FUEL	1.922	1.585	.789	.776	.688
WEIGHT FLOW, LB./HR.	.279	.282	.197	.202	.168
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.7	23.2	40.9	45.5	45.9
LB. PER 1000 LB. OF FUEL	4.064	4.325	5.040	4.708	4.727
WEIGHT FLOW, LB./HR.	.589	.770	1.260	1.224	1.253
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00710	.00710	.00711	.00711	.00703
SMOKE NUMBER	18.10	17.50	15.70	19.30	21.70
CORRECTED WEIGHT FLOW	.02131	.02131	.02134	.02134	.02110
SMOKE NUMBER	32.50	33.70	38.70	38.60	36.10
CORRECTED WEIGHT FLOW	.03550	.03550	.03555	.03548	.03507
SMOKE NUMBER	41.80	42.20	38.60	49.40	48.20
CORRECTED WEIGHT FLOW	.04970	.04970	.04976	.04965	.04908
SMOKE NUMBER	45.80	51.80	46.40	59.60	56.60
SMOKE NUMBER AT WA=0.823	34.50	36.50	33.80	41.90	41.10

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-14-79 FUEL=AV. KERD. P BARO= 28.76

DATA POINT NUMBER		46	47	48	49	50
EMISSION RATE LB/HR						
	CARBON MONOXIDE	5.256	5.684	3.682	5.194	4.912
	UNBURNED HYDROCARBONS	1.492	.831	.096	.148	.085
	OXIDES OF NITROGEN	.589	.770	1.268	1.224	1.253
	NITRIC OXIDE	.311	.468	1.063	1.022	1.078
POWER LEVEL HP		0.00	74.86	187.54	241.28	256.12
TOTAL CORRECTED HORSEPOWER		0.00	79.34	190.97	245.66	263.01
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR						
	CARBON MONOXIDE	0.000	74.868	19.632	21.526	19.179
	UNBURNED HYDROCARBONS	0.000	11.187	.514	.582	.334
	OXIDES OF NITROGEN	0.000	10.285	6.719	5.073	4.891
	NITRIC OXIDE	0.000	6.517	5.668	4.237	4.188

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-14-79
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 288. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: TANGENTIAL CAN

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.458	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	19.066	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.961	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: NONE P/N: 698166-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE:
ENGINE TOTAL SERVICE: HR. TIME SINCE ENGINE OVERHAUL: HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 4 DATE: 6-14-75 TIME: 08.45 BARO. PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 39.0 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 90.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	51	52	53	54	55
POWER SETTING, CORRECTED HP.	0.00	79.42	199.82	0.00	45.36
N1 SPEED, RPM	41670.00	41510.00	41180.00	41090.00	41020.00
FUEL FLOW (MEAS.) LB./HR.	145.00	188.00	240.00	268.00	264.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.22	5.82	5.44	7.87	6.88
COMPRESSOR INLET TEMP., DEG. F	39.0	39.0	39.0	39.0	39.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	62.55	61.57	60.64	55.48	57.85
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	370.00	375.00	384.00	342.00	345.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.20	1.92
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	54.26	55.88
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	361.00	363.00
ENGINE EXHAUST GAS TEMP., DEG. F	472.0	586.0	828.0	924.0	928.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	127.500	70.500	9.300	15.000	12.000
CARBON MONOXIDE (CO), PPMV	249.616	274.834	196.765	306.306	298.393
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.500	23.900	40.400	44.000	46.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.314	1.765	2.639	3.089	3.136
NITRIC OXIDE (NO), PPMV	10.000	15.000	35.000	38.500	39.900
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.828	4.496	.481	.551	.435
CARBON MONOXIDE (CO)	37.060	30.665	14.858	19.699	18.411
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.024	4.388	5.008	4.648	4.791
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.569	.809	.099	.143	.115
CARBON MONOXIDE (CO)	5.374	5.528	3.683	5.122	4.861
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.583	.788	1.242	1.289	1.265
ENGINE WORK OUTPUT, MEAS. SHP	0.00	74.86	187.56	0.00	42.75
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	241.43	212.19
ENGINE WORK OUTPUT, TOTAL HP	0.00	74.86	187.56	241.43	254.94
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.15	98.88	99.62	99.49	99.53
F/A (EMISSIONS)	.006	.009	.013	.015	.015

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-14-75 FUEL=AV. KERO. P BARO= 28.76
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 48. REL HUM= 100.00 SPEC HUM= .005000
FUEL H/C= 1.9288 STOI F/A= .068ZZ L H V= 18470. S LN T,F= 380.0 FLO.L/M= 14.160 SL TIM.S= 6.5000

DATA POINT NUMBER	51	52	53	54	55
PERCENT MAX. CORRECTED POWER	0.0	39.7	99.5	0.0	22.7
CORRECTED SHAFT HP	0.0	79.4	199.0	0.0	45.4
MEASURED SHAFT HP	0.0	74.9	187.6	0.0	42.8
EXHAUST GAS TEMP., DEG.F	472.8	586.8	828.0	924.0	928.0
SHAFT SPEED, N1, RPM	41670.0	41510.0	41180.0	41090.0	41020.0
COMPRESSOR DSCHG. PRES.,PSIA	62.6	61.6	60.6	55.5	57.1
COMPRESSOR DSCHG. TEMP,DEG F	370.0	375.0	384.0	342.0	345.0
EXHAUST GAS PRESS., PSIA	13.68	13.75	13.87	13.85	13.85
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.243	1.959
COMPRESSOR MAP FLOW,LB/SEC	6.18	5.72	5.18	6.77	6.67
FA RATIO BASED ON MAP FLOW	.0066	.0087	.0133	.0158	.0154
CORRECTED FUEL FLOW , LB/HR	145.0	180.0	246.0	260.0	264.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0127	.0148	.0150
EQUIVALENCE RATIO	.095	.126	.186	.217	. .220
LOADING W/P**N/V/E(T/540)	.378	.361	.338	.368	.362
COMB EFFIC FROM EMISSIONS	98.179	98.884	99.615	99.486	99.529

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.76	2.64	3.09	3.14
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.12	3.12
WEIGHT FLOW, LB./HR.	444.6	556.8	776.1	811.6	824.7
CARBON MONOXIDE					
PPM BY VOLUME, WET	249.6	274.8	196.8	386.3	298.4
LB. PER 1000 LB. OF FUEL	37.860	38.669	14.850	19.699	18.411
WEIGHT FLOW, LB./HR.	5.374	5.520	3.683	5.122	4.861
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	127.5	78.5	9.3	15.0	12.8
LB. PER 1000 LB. OF FUEL	18.820	4.496	.681	.551	.485
WEIGHT FLOW, LB./HR.	1.569	.889	.899	.143	.115
RATIO LB HC/LB CO	.2928	.1466	.0278	.0288	.0236
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.0	15.0	35.0	38.5	39.9
LB. PER 1000 LB. OF FUEL	2.439	2.749	4.339	4.067	4.155
WEIGHT FLOW, LB./HR.	.354	.495	1.076	1.057	1.097
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.5	8.9	5.4	5.5	6.1
LB. PER 1000 LB. OF FUEL	1.585	1.631	.669	.581	.635
WEIGHT FLOW, LB./HR.	.230	.294	.166	.151	.168
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.5	23.9	40.4	44.0	46.0
LB. PER 1000 LB. OF FUEL	4.024	4.380	5.006	4.648	4.791
WEIGHT FLOW, LB./HR.	.583	.788	1.242	1.209	1.265
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08699	.08781	.08785	.08785	.08787
SMOKE NUMBER	24.78	19.38	15.78	22.98	20.58
CORRECTED WEIGHT FLOW	.02896	.02184	.02115	.02117	.02122
SMOKE NUMBER	38.88	39.58	30.18	43.48	38.68
CORRECTED WEIGHT FLOW	.03435	.03511	.03524	.03528	.03534
SMOKE NUMBER	44.88	48.28	40.48	53.88	48.88
CORRECTED WEIGHT FLOW	.04888	.04913	.04931	.04937	.04944
SMOKE NUMBER	49.48	51.88	47.88	59.68	56.68
SMOKE NUMBER AT WA=8.023	39.48	39.18	33.68	49.18	41.48

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-14-75 FUEL=AV. KERO. P BARO= 28.76

DATA POINT NUMBER	51	52	53	54	55
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.374	5.528	3.683	5.122	4.861
UNBURNED HYDROCARBONS	1.569	.809	.099	.143	.115
OXIDES OF NITROGEN	.583	.788	1.242	1.289	1.265
NITRIC OXIDE	.354	.495	1.076	1.057	1.097
POWER LEVEL HP	0.00	74.86	187.58	241.43	254.94
TOTAL CORRECTED HORSEPOWER	0.00	79.42	199.02	246.27	261.81
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	73.737	19.633	21.215	19.066
UNBURNED HYDROCARBONS	0.000	10.811	.530	.594	.458
OXIDES OF NITROGEN	0.000	10.533	6.621	5.086	4.961
NITRIC OXIDE	0.000	6.611	5.736	4.380	4.303

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LAGG2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-14-75
MODEL NO.: GTCP85-98CK S/N: 36173 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 288. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.462	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	18.752	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.823	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0. HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 4 DATE: 6-14-75 TIME: 08.58 BARO. PRESS.: 28.740 IN. HGA.
AMBIENT AIR TEMP.: 39.0 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	56	57	58	59	60
POWER SETTING, CORRECTED HP.	0.00	79.36	198.91	0.00	45.31
N1 SPEED, RPM	41660.00	41490.00	41170.00	41870.00	40990.00
FUEL FLOW (MEAS.) LB./HR.	144.00	178.00	248.00	260.00	206.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.22	5.65	5.40	6.96	6.81
COMPRESSOR INLET TEMP., DEG. F	40.0	40.0	40.0	40.0	40.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	62.46	61.77	60.29	55.34	57.05
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	371.00	376.00	385.00	343.00	346.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.28	1.92
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	54.11	55.97
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	362.00	364.00
ENGINE EXHAUST GAS TEMP., DEG. F	476.0	588.0	826.0	926.0	925.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	117.000	72.000	9.900	19.500	12.300
CARBON MONOXIDE (CO), PPMV	242.211	275.661	197.232	306.386	285.169
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.600	24.000	41.300	45.500	46.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.306	1.734	2.661	3.165	3.154
NITRIC OXIDE (NO), PPMV	11.000	19.000	35.000	39.500	40.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.003	4.671	.424	.788	.443
CARBON MONOXIDE (CO)	36.228	31.312	14.766	19.227	17.983
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.078	4.475	5.879	4.691	4.817
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.440	.831	.105	.182	.116
CARBON MONOXIDE (CO)	9.217	9.574	3.662	4.999	4.703
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.587	.797	1.268	1.228	1.281
ENGINE WORK OUTPUT, MEAS. SHP	0.00	74.82	187.54	0.00	42.72
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	241.57	212.36
ENGINE WORK OUTPUT, TOTAL HP	0.00	74.82	187.54	241.57	255.08
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.27	98.85	99.62	99.49	99.54
F/A (EMISSIONS)	.006	.008	.013	.015	.019

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-14-75 FUEL=AV. KERO. P BARO= 28.74
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 40. REL HUM= 100.00 SPEC HUM= .005000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	56	57	58	59	60
PERCENT MAX. CORRECTED POWER	0.0	39.7	99.5	0.0	22.7
CORRECTED SHAFT HP	0.0	79.4	198.9	0.0	45.3
MEASURED SHAFT HP	0.0	74.8	187.5	0.0	42.7
EXHAUST GAS TEMP., DEG.F	476.0	588.0	826.0	926.0	925.0
SHAFT SPEED, N1, RPM	41660.0	41490.0	41170.0	41070.0	40990.0
COMPRESSOR DSCHG. PRES.,PSIA	62.5	61.8	60.3	55.3	57.1
COMPRESSOR DSCHG. TEMP,DEG F	371.0	376.0	385.0	343.0	346.0
EXHAUST GAS PRESS., PSIA	13.69	13.75	13.87	13.84	13.85
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.248	1.964
COMPRESSOR MAP FLOW,LB/SEC	6.87	5.78	5.16	6.77	6.62
FA RATIO BASED ON MAP FLOW	.0066	.0087	.0133	.0158	.0157
CORRECTED FUEL FLOW , LB/HR	144.0	178.8	248.0	260.8	266.0
FA RATIO CALC. FROM EMISSION	.0064	.0085	.0126	.0152	.0151
EQUIVALENCE RATIO	.094	.124	.187	.222	.221
LOADING W/P**N/V/E(T/540)	.377	.357	.333	.369	.358
COMB EFFIC FROM EMISSIONS	98.270	98.854	99.615	99.486	99.538

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.73	2.66	3.17	3.15
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.12	3.12
WEIGHT FLOW, LB./HR.	442.0	550.4	776.2	811.7	831.1
CARBON MONOXIDE					
PPM BY VOLUME, WET	242.2	275.9	197.2	386.3	285.2
LB. PER 1000 LB. OF FUEL	36.228	31.312	14.766	19.227	17.983
WEIGHT FLOW, LB./HR.	5.217	5.574	3.662	4.999	4.783
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	117.8	72.8	9.9	19.5	12.3
LB. PER 1000 LB. OF FUEL	18.033	4.671	.424	.788	.443
WEIGHT FLOW, LB./HR.	1.440	.831	.105	.182	.118
RATIO LB HC/LB CO	.2761	.1492	.0287	.0364	.0247
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.0	15.0	35.6	39.5	48.5
LB. PER 1000 LB. OF FUEL	2.783	2.797	4.403	4.073	4.195
WEIGHT FLOW, LB./HR.	.389	.498	1.092	1.059	1.116
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	5.6	9.8	5.5	6.8	6.8
LB. PER 1000 LB. OF FUEL	1.376	1.678	.676	.619	.621
WEIGHT FLOW, LB./HR.	.198	.299	.168	.161	.165
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.6	24.8	41.3	45.5	46.5
LB. PER 1000 LB. OF FUEL	4.078	4.475	5.079	4.691	4.817
WEIGHT FLOW, LB./HR.	.587	.797	1.260	1.220	1.281
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00786	.00786	.00785	.00785	.00785
SMOKE NUMBER	18.10	16.98	15.70	27.78	21.10
CORRECTED WEIGHT FLOW	.02119	.02119	.02114	.02113	.02113
SMOKE NUMBER	34.98	33.78	29.50	46.40	38.88
CORRECTED WEIGHT FLOW	.03530	.03530	.03522	.03520	.03520
SMOKE NUMBER	41.60	44.60	38.60	56.60	47.68
CORRECTED WEIGHT FLOW	.04920	.04942	.04929	.04928	.04919
SMOKE NUMBER	49.40	53.88	48.88	65.10	57.88
SMOKE NUMBER AT WA=0.023	36.38	37.40	33.50	49.30	41.58

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NC, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-14-75 FUEL=AV. KERO. P BARO= 28.74

DATA POINT NUMBER	56	57	58	59	60
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.217	5.574	3.662	4.999	4.783
UNBURNED HYDROCARBONS	1.448	.831	.185	.182	.118
OXIDES OF NITROGEN	.587	.797	1.260	1.220	1.281
NITRIC OXIDE	.349	.499	1.092	1.059	1.116
POWER LEVEL HP	0.00	74.82	187.54	241.57	255.88
TOTAL CORRECTED HORSEPOWER	0.00	79.36	198.91	246.84	262.38
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	74.494	19.527	20.694	18.752
UNBURNED HYDROCARBONS	0.000	11.113	.568	.753	.462
OXIDES OF NITROGEN	0.000	10.646	6.717	5.049	5.023
NITRIC OXIDE	0.000	6.654	5.822	4.383	4.375

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG.V38 N136 CALC. DATE: 6-18-75
MODEL NO.: GTCP85-9CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.329 LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	16.783 LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.385 LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 5 DATE: 6-10-75 TIME: 10 38 BARO. PRESS.: 28.680 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 20.00 PERCENT SPECIFIC HUMIDITY: .002080 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	61	62	63	64	65
POWER SETTING, CORRECTED HP.	0.00	79.05	198.01	0.00	45.79
N1 SPEED, RPM	41700.00	41520.00	41220.00	41090.00	41090.00
FUEL FLOW (MEAS.) LB./HR.	130.00	167.00	230.00	253.00	258.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.98	5.66	5.36	6.67	6.57
COMPRESSOR INLET TEMP., DEG. F	61.0	60.0	60.0	58.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.15	59.41	59.61	52.78	54.40
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	401.00	402.00	412.00	366.00	375.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.11	1.83
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.46	53.52
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	398.00	397.00
ENGINE EXHAUST GAS TEMP., DEG. F	480.0	593.0	812.0	970.0	970.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	102.000	66.000	18.000	19.500	9.000
CARBON MONOXIDE (CO), PPMV	222.767	254.593	247.140	376.986	262.119
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.000	25.000	42.200	48.500	51.200
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.245	1.681	2.478	3.207	3.159
NITRIC OXIDE (NO), PPMV	8.500	16.000	36.500	42.000	43.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.160	4.428	.825	.689	.324
CARBON MONOXIDE (CO)	35.003	29.831	19.812	22.318	16.512
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.387	4.812	5.557	4.926	5.298
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.191	.738	.198	.174	.084
CARBON MONOXIDE (CO)	4.550	4.982	4.557	5.697	4.268
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.570	.804	1.278	1.246	1.367
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.85	189.98	0.00	43.98
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	238.96	209.86
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.85	189.98	238.96	253.84
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.37	98.91	99.46	99.39	99.58
F/A (EMISSIONS)	.006	.008	.012	.015	.015

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-9CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-10-75 FUEL=AV. KERO. P BARO= 28.68
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 19. REL HUM= 20.00 SPEC HUM= .002000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	61	62	63	64	65
PERCENT MAX. CORRECTED POWER	0.0	39.5	99.0	0.0	22.9
CORRECTED SHAFT HP	0.0	79.0	198.0	0.0	45.8
MEASURED SHAFT HP	0.0	75.6	190.0	0.0	44.0
EXHAUST GAS TEMP., DEG.F	480.0	593.0	812.0	978.0	978.0
SHAFT SPEED, N1, RPM	41700.0	41520.0	41220.0	41090.0	41090.0
COMPRESSOR DSCHG. PRES.,PSIA	60.1	59.4	59.6	52.8	54.4
COMPRESSOR DSCHG. TEMP,DEG F	401.0	402.0	412.0	366.0	375.0
EXHAUST GAS PRESS., PSIA	13.66	13.78	13.83	13.81	13.82
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.200	1.914
COMPRESSOR MAP FLOW,LB/SEC	6.01	5.67	5.32	6.62	6.49
FA RATIO BASED ON MAP FLOW	.0060	.0082	.0120	.0156	.0154
CORRECTED FUEL FLOW , LB/HR	130.0	167.0	230.0	253.0	256.0
FA RATIO CALC. FROM EMISSION	.0061	.0082	.0119	.0154	.0151
EQUIVALENCE RATIO	.090	.120	.175	.226	.222
LOADING W/P**N/V/E(T/540)	.377	.363	.332	.379	.366
COMB EFFIC FROM EMISSIONS	98.373	98.911	99.462	99.391	99.583

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.25	1.68	2.48	3.21	3.16
LB. CO2 PER LB. OF FUEL	3.07	3.10	3.12	3.12	3.13
WEIGHT FLOW, LB./HR.	399.6	516.9	717.8	788.2	806.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	222.8	254.6	247.1	377.8	262.1
LB. PER 1000 LB. OF FUEL	35.003	29.831	19.812	23.310	16.512
WEIGHT FLOW, LB./HR.	4.550	4.982	4.557	5.897	4.268
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	102.0	66.0	18.0	19.5	9.0
LB. PER 1000 LB. OF FUEL	9.160	4.420	.825	.669	.324
WEIGHT FLOW, LB./HR.	1.191	.738	.198	.174	.084
RATIO LB HC/LB CO	.2617	.1482	.0416	.0296	.0196
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	8.5	16.8	36.5	42.8	43.8
LB. PER 1000 LB. OF FUEL	2.194	3.079	4.806	4.266	4.532
WEIGHT FLOW, LB./HR.	.285	.514	1.185	1.079	1.169
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	8.5	9.8	5.7	6.5	7.4
LB. PER 1000 LB. OF FUEL	2.194	1.732	.751	.660	.766
WEIGHT FLOW, LB./HR.	.285	.289	.173	.167	.198
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.0	25.8	42.2	48.5	51.2
LB. PER 1000 LB. OF FUEL	4.387	4.812	5.557	4.926	5.298
WEIGHT FLOW, LB./HR.	.570	.804	1.278	1.246	1.367
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00702	.00780	.00698	.00698	.00784
SMOKE NUMBER	7.20	15.70	16.30	26.50	18.10
CORRECTED WEIGHT FLOW	.02107	.02099	.02094	.02094	.02113
SMOKE NUMBER	10.80	31.30	32.50	45.80	33.70
CORRECTED WEIGHT FLOW	.03505	.03492	.03484	.03482	.03520
SMOKE NUMBER	16.90	41.00	39.80	59.00	42.80
CORRECTED WEIGHT FLOW	.04907	.04889	.04877	.04871	.04929
SMOKE NUMBER	21.70	47.80	46.40	64.50	50.60
SMOKE NUMBER AT WA=0.023	14.30	34.20	34.20	49.50	36.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-9CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-10-75 FUEL=AV. KERO. P BARO= 28.68

DATA POINT NUMBER	61	62	63	64	65
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.550	4.982	4.557	5.897	4.268
UNBURNED HYDROCARBONS	1.191	.738	.198	.174	.884
OXIDES OF NITROGEN	.578	.804	1.278	1.246	1.367
NITRIC OXIDE	.285	.514	1.105	1.079	1.169
POWER LEVEL HP	0.00	75.85	189.98	238.96	253.84
TOTAL CORRECTED HORSEPOWER	0.00	79.05	198.01	249.05	265.14
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	65.681	23.984	24.688	16.783
UNBURNED HYDROCARBONS	0.000	9.732	.998	.730	.329
OXIDES OF NITROGEN	0.000	10.594	6.727	5.216	5.385
NITRIC OXIDE	0.000	6.780	5.819	4.517	4.607

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-11-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.308	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	16.194	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.413	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 5 DATE: 6-11-75 TIME: 09.25 BARO. PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 20.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	66	67	68	69	70
POWER SETTING, CORRECTED HP.	0.00	78.53	197.22	0.00	45.94
N1 SPEED, RPM	41680.00	41510.00	41210.00	41113.00	41070.00
FUEL FLOW (MEAS.) LB./HR.	130.00	168.00	230.00	252.00	257.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.81	5.76	5.34	6.66	6.57
COMPRESSOR INLET TEMP., DEG. F	61.0	61.0	61.0	60.8	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.64	59.41	59.66	52.78	54.50
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	401.00	403.00	414.00	368.00	375.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.12	1.83
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.55	53.42
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	392.00	396.00
ENGINE EXHAUST GAS TEMP., DEG. F	480.0	596.0	815.0	968.0	968.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	97.500	66.000	18.000	21.000	8.400
CARBON MONOXIDE (CO), PPMV	222.787	257.093	249.616	386.000	252.100
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.500	24.000	42.000	48.000	51.300
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.265	1.664	2.488	3.207	3.148
NITRIC OXIDE (NO), PPMV	10.000	14.500	34.500	40.500	44.400
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	8.622	4.465	.821	.742	.384
CARBON MONOXIDE (CO)	34.468	30.428	19.926	23.859	15.945
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.193	4.666	5.587	4.874	5.330
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.121	.750	.189	.187	.078
CARBON MONOXIDE (CO)	4.481	5.112	4.583	6.013	4.098
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.545	.784	1.287	1.228	1.370
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.63	189.94	0.00	44.25
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	239.48	208.88
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.63	189.94	239.48	253.05
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.43	98.69	99.46	99.37	99.60
F/A (EMISSIONS)	.006	.008	.012	.015	.015

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41680. DEW PT,F= 19. FUEL=AV. KERO. P BARO= 28.76
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 REL HUM= 20.00 SPEC HUM= .002080
FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	66	67	68	69	70
PERCENT MAX. CORRECTED POWER	0.0	39.3	98.6	0.0	23.0
CORRECTED SHAFT HP	0.0	78.5	197.2	0.0	45.9
MEASURED SHAFT HP	0.0	75.6	189.9	0.0	44.2
EXHAUST GAS TEMP., DEG.F	488.0	596.0	815.0	968.0	968.0
SHAFT SPEED, N1, RPM	41680.0	41510.0	41210.0	41110.0	41070.0
COMPRESSOR DSCHG. PRES.,PSIA	60.6	59.4	59.7	52.8	54.5
COMPRESSOR DSCHG. TEMP,DEG F	401.1	403.0	414.0	366.0	375.0
EXHAUST GAS PRESS., PSIA	13.78	13.74	13.88	13.85	13.86
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.203	1.905
COMPRESSOR MAP FLOW,LB/SEC	6.87	5.65	5.32	6.64	6.49
FA RATIO BASED ON MAP FLOW	.0059	.0063	.0120	.0155	.0153
CORRECTED FUEL FLOW , LB/HR	130.0	166.0	230.0	252.0	257.0
FA RATIO CALC. FROM EMISSION	.0062	.0081	.0120	.0154	.0151
EQUIVALENCE RATIO	.391	.119	.176	.226	.221
LOADING W/P**N/V/E(T/540)	.375	.361	.331	.379	.365
COMB EFFIC FROM EMISSIONS	98.433	98.893	99.459	99.374	99.598

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.27	1.66	2.49	3.21	3.15
LB. CO2 PER LB. OF FUEL	3.08	3.09	3.12	3.11	3.13
WEIGHT FLOW, LB./HR.	399.9	519.8	717.7	784.9	803.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	222.8	257.1	249.6	386.8	252.1
LB. PER 1000 LB. OF FUEL	34.468	30.428	19.926	23.859	15.945
WEIGHT FLOW, LB./HR.	4.481	5.112	4.583	6.013	4.098
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	97.5	66.8	18.8	21.8	8.4
LB. PER 1000 LB. OF FUEL	8.622	4.469	.821	.742	.304
WEIGHT FLOW, LB./HR.	1.121	.750	.189	.187	.078
RATIO LB HC/LB CO	.2501	.1467	.0412	.0311	.0190
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.8	14.5	34.5	40.5	44.4
LB. PER 1000 LB. OF FUEL	2.541	2.819	4.524	4.112	4.613
WEIGHT FLOW, LB./HR.	.330	.474	1.041	1.036	1.186
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.5	9.5	7.5	7.5	6.9
LB. PER 1000 LB. OF FUEL	1.652	1.847	.983	.762	.717
WEIGHT FLOW, LB./HR.	.215	.310	.226	.192	.184
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.5	24.0	42.0	48.0	51.3
LB. PER 1000 LB. OF FUEL	4.193	4.666	5.507	4.874	5.330
WEIGHT FLOW, LB./HR.	.545	.784	1.267	1.228	1.370
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.03782	.03699	.03698	.03696	.03695
SMOKE NUMBER	9.60	18.10	15.10	30.10	16.90
CORRECTED WEIGHT FLOW	.02106	.02094	.02094	.02086	.02085
SMOKE NUMBER	16.90	32.50	31.30	50.60	34.90
CORRECTED WEIGHT FLOW	.03503	.03484	.03482	.03472	.03473
SMOKE NUMBER	22.30	42.80	41.00	68.20	43.40
CORRECTED WEIGHT FLOW	.04895	.04877	.04866	.04850	.04854
SMOKE NUMBER	25.90	49.40	49.80	65.10	56.30
SMOKE NUMBER AT WA=0.823	18.90	36.20	33.80	52.10	37.80

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75 FUEL=AV. KERO. P BARO= 28.76

DATA POINT NUMBER	66	67	68	69	70
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.481	5.112	4.583	6.013	4.096
UNBURNED HYDROCARBONS	1.121	.758	.189	.187	.078
OXIDES OF NITROGEN	.545	.784	1.267	1.228	1.370
NITRIC OXIDE	.338	.474	1.041	1.036	1.186
POWER LEVEL HP	0.00	75.63	189.94	239.48	253.05
TOTAL CORRECTED HORSEPOWER	0.00	78.53	197.22	249.36	263.56
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	67.588	24.129	25.187	16.194
UNBURNED HYDROCARBONS	0.000	9.917	.995	.781	.308
OXIDES OF NITROGEN	0.000	10.364	6.669	5.128	5.413
NITRIC OXIDE	0.000	6.262	5.478	4.327	4.685

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG. V38 N136 CALC. DATE: 6-11-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 288. ▸ BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.214	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	14.827	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.491	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 5 DATE: 6-11-75 TIME: 18.15 BARO. PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 20.00 PERCENT SPECIFIC HUMIDITY: .002088 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	71	72	73	74	75
POWER SETTING, CORRECTED HP.	0.00	78.87	197.12	0.00	45.69
N1 SPEED, RPM	41660.00	41500.00	41190.00	41090.00	41030.00
FUEL FLOW (MEAS.) LB./HR.	138.00	167.00	230.00	253.00	260.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.00	5.73	5.35	6.59	6.45
COMPRESSOR INLET TEMP., DEG. F	60.0	59.0	61.0	60.0	59.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.39	59.66	59.41	52.54	54.26
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	399.00	401.00	416.00	372.00	376.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.09	1.82
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.16	53.13
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	395.00	397.00
ENGINE EXHAUST GAS TEMP., DEG. F	488.0	595.0	822.0	986.0	986.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	97.500	63.000	16.500	9.600	6.000
CARBON MONOXIDE (CO), PPMV	217.999	247.140	192.110	249.616	237.311
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.400	24.300	42.500	52.500	53.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.225	1.664	2.466	3.267	3.267
NITRIC OXIDE (NO), PPMV	8.500	14.700	34.500	46.100	47.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	8.983	4.265	.755	.335	.209
CARBON MONOXIDE (CO)	34.827	29.272	15.372	15.218	14.475
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.384	4.728	5.586	5.258	5.368
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.157	.712	.174	.085	.054
CARBON MONOXIDE (CO)	4.527	4.889	3.536	3.850	3.763
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.559	.798	1.285	1.330	1.394
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.81	189.65	0.00	43.91
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	239.87	209.90
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.81	189.65	239.87	253.82
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.40	98.94	99.57	99.61	99.64
F/A (EMISSIONS)	.006	.008	.012	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-79
RAT SHP= 200. RA EGT.F= 1150. RAT SPD= 41600. DEW PT.F= 19. FUEL=AV. KERO. P BARO= 28.76
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LH T.F= 300.0 REL HUM= 20.00 SPEC HUM= .002888
FLO.L/M= 14.160 SL TIM.S= 6.5000

	71	72	73	74	75
DATA POINT NUMBER	0.0	39.4	98.6	0.0	22.6
PERCENT MAX. CORRECTED POWER	0.0	79.9	197.1	0.0	45.7
CORRECTED SHAFT HP	0.0	75.8	189.6	0.0	43.9
MEASURED SHAFT HP	488.8	595.8	822.8	986.8	986.8
EXHAUST GAS TEMP., DEG.F	41600.0	41500.0	41198.8	41898.8	41038.8
SHAFT SPEED, N1, RPM	68.4	59.7	59.4	52.5	54.3
COMPRESSOR DSCHG. PRES.,PSIA	399.8	401.8	416.8	372.8	376.8
COMPRESSOR DSCHG. TEMP.DEG F	13.78	13.74	13.88	13.85	13.86
EXHAUST GAS PRESS., PSIA	0.000	0.000	0.000	2.179	1.095
CORRECTED BLEED FLOW, LB/SEC	6.02	5.53	5.32	6.57	6.47
COMPRESSOR MAP FLOW,LB/SEC	.0060	.0084	.0120	.0157	.0155
FA RATIO BASED ON MAP FLOW	138.8	167.8	238.8	253.8	248.8
CORRECTED FUEL FLOW , LB/HR	.0060	.0081	.0119	.0156	.0156
FA RATIO CALC. FROM EMISSION	.000	.119	.175	.229	.229
EQUIVALENCE RATIO	.376	.352	.332	.375	.366
LOADING W/P**N/V/E(T/540)	98.488	98.937	99.572	99.613	99.641
COMB EFFIC FROM EMISSIONS					

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.22	1.66	2.49	3.27	3.27
LB. CO2 PER LB. OF FUEL	3.07	3.18	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	399.7	517.1	719.4	791.7	614.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	218.8	247.1	192.1	249.6	237.3
LB. PER 1000 LB. OF FUEL	34.827	29.272	15.372	15.218	14.475
WEIGHT FLOW, LB./HR.	4.527	4.889	3.536	3.858	3.763
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	97.5	63.8	16.5	9.6	6.8
LB. PER 1000 LB. OF FUEL	8.983	4.268	.756	.335	.289
WEIGHT FLOW, LB./HR.	1.197	.712	.174	.085	.054
RATIO LB HC/LB CO	.2956	.1457	.0491	.0220	.0149
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	8.5	14.7	34.5	46.1	47.5
LB. PER 1000 LB. OF FUEL	2.231	2.568	4.535	4.617	4.759
WEIGHT FLOW, LB./HR.	.298	.478	1.043	1.168	1.237
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	7.9	9.6	8.8	6.4	6.8
LB. PER 1000 LB. OF FUEL	2.873	1.666	1.051	.641	.681
WEIGHT FLOW, LB./HR.	.278	.312	.242	.162	.196
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.4	24.3	42.5	52.5	53.5
LB. PER 1000 LB. OF FUEL	4.394	4.726	5.586	5.256	5.360
WEIGHT FLOW, LB./HR.	.599	.790	1.285	1.330	1.394
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00694	.00693	.00693	.00695	.00694
SMOKE NUMBER	7.28	16.98	16.98	21.78	28.58
CORRECTED WEIGHT FLOW	.02883	.02879	.02879	.02885	.02882
SMOKE NUMBER	15.78	31.98	32.58	37.38	31.38
CORRECTED WEIGHT FLOW	.03465	.03459	.03463	.03476	.03467
SMOKE NUMBER	22.38	41.68	43.48	47.08	42.28
CORRECTED WEIGHT FLOW	.04833	.04833	.04848	.04855	.04854
SMOKE NUMBER	26.58	50.08	47.08	50.68	50.68
SMOKE NUMBER AT WA=8.523	18.38	35.78	35.58	39.78	36.78

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36173 COMB P/N= 698168-3 TEST DATE 6-11-75 FUEL=AV. KERO. P BARO= 28.76

DATA POINT NUMBER	71	72	73	74	75
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.527	4.889	3.536	3.650	3.763
UNBURNED HYDROCARBONS	1.157	.712	.174	.085	.054
OXIDES OF NITROGEN	.559	.798	1.285	1.338	1.394
NITRIC OXIDE	.298	.478	1.043	1.168	1.287
POWER LEVEL HP	0.00	75.81	189.85	239.07	253.62
TOTAL CORRECTED HORSEPOWER	0.00	78.87	197.12	248.95	264.09
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	64.484	18.623	16.185	14.627
UNBURNED HYDROCARBONS	0.000	9.396	.914	.354	.214
OXIDES OF NITROGEN	0.000	10.415	6.768	5.564	5.491
NITRIC OXIDE	0.000	6.300	5.494	4.886	4.875

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-11-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ATSM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.221	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	15.478	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.352	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 6 DATE: 6-11-75 TIME: 13:00 BARO. PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	76	77	78	79	80
POWER SETTING, CORRECTED HP.	0.00	78.68	197.13	0.00	44.44
N1 SPEED, RPM	41600.00	41440.00	41110.00	40810.00	40950.00
FUEL FLOW (MEAS.) LB./HR.	140.00	175.00	242.00	262.00	268.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.91	5.78	5.02	6.79	6.69
COMPRESSOR INLET TEMP., DEG. F	59.0	60.0	60.0	61.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	59.66	58.82	57.94	52.29	54.78
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	390.00	393.00	401.00	360.00	368.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.16	1.92
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.16	53.52
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	382.00	380.00
ENGINE EXHAUST GAS TEMP., DEG. F	500.0	623.0	884.0	998.0	993.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	115.500	66.000	9.300	6.000	6.000
CARBON MONOXIDE (CO), PPMV	242.211	269.721	186.552	249.616	239.757
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.000	25.000	43.900	51.000	50.500
CARBON DIOXIDE (CO2), PERCENT BY VO..	1.339	1.751	2.796	3.297	3.267
NITRIC OXIDE (NO), PPMV	10.300	17.000	36.000	45.000	44.700
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.648	4.243	.379	.287	.289
CARBON MONOXIDE (CO)	35.369	30.334	13.302	15.881	14.623
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.078	4.618	5.142	5.961	5.859
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.350	.742	.092	.094	.056
CARBON MONOXIDE (CO)	4.952	5.308	3.219	3.951	3.919
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.571	.808	1.244	1.326	1.356
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.70	189.67	0.00	42.68
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	238.21	210.65
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.70	189.67	238.21	253.33
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.32	98.91	99.65	99.63	99.64
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698166-3 TEST DATE 6-11-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 48.
FUEL H/C= 1.9268 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0

FUEL=AV. KERO. P BARO= 28.76
REL HUM= 49.88 SPEC HUM= .005888
FLO,L/M= 14.168 SL TIM,S= 6.5888

DATA POINT NUMBER	76	77	78	79	80
PERCENT MAX. CORRECTED POWER	0.0	39.3	98.6	0.0	22.2
CORRECTED SHAFT HP	0.0	78.7	197.1	0.0	44.4
MEASURED SHAFT HP	0.0	75.7	189.7	0.0	42.7
EXHAUST GAS TEMP., DEG.F	500.0	623.0	884.0	998.0	993.0
SHAFT SPEED, N1, RPM	41600.0	41440.0	41110.0	40018.0	40950.0
COMPRESSOR DSCHG. PRES.,PSIA	59.7	58.6	57.9	52.3	54.7
COMPRESSOR DSCHG. TEMP,DEG F	390.0	393.0	401.0	360.0	360.0
EXHAUST GAS PRESS., PSIA	13.70	13.75	13.88	13.85	13.86
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.268	1.594
COMPRESSOR MAP FLOW,LB/SEC	5.97	5.57	5.07	6.62	6.57
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0133	.0164	.0168
CORRECTED FUEL FLOW , LB/HR	140.0	175.0	242.0	262.0	268.0
FA RATIO CALC. FROM EMISSION	.0066	.0085	.0134	.0158	.0156
EQUIVALENCE RATIO	.036	.125	.196	.231	.229
LOADING W/P**N/V/E(T/540)	.388	.369	.339	.384	.372
COMB EFFIC FROM EMISSIONS	98.322	98.914	99.654	99.627	99.638

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.34	1.75	2.88	3.38	3.27
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	430.1	541.6	758.0	820.0	839.0
CARBON MONOXIDE					
PPM BY VOLUME, WET	242.2	269.7	186.6	249.6	239.0
LB. PER 1000 LB. OF FUEL	35.369	30.334	13.382	15.881	14.623
WEIGHT FLOW, LB./HR.	4.952	5.388	3.219	3.951	3.919
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	115.5	66.8	9.3	6.8	6.8
LB. PER 1000 LB. OF FUEL	9.648	4.243	.379	.287	.289
WEIGHT FLOW, LB./HR.	1.350	.742	.092	.054	.056
RATIO LB HC/LB CO	.2726	.1399	.0285	.0137	.0143
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.3	17.8	38.8	45.8	44.7
LB. PER 1000 LB. OF FUEL	2.471	3.141	4.451	4.466	4.478
WEIGHT FLOW, LB./HR.	.346	.559	1.077	1.178	1.208
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.7	8.8	5.9	6.8	5.8
LB. PER 1000 LB. OF FUEL	1.607	1.478	.691	.595	.581
WEIGHT FLOW, LB./HR.	.225	.259	.167	.156	.156
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.0	25.8	43.9	51.8	50.5
LB. PER 1000 LB. OF FUEL	4.078	4.618	5.142	5.061	5.059
WEIGHT FLOW, LB./HR.	.571	.808	1.244	1.326	1.356
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00781	.00699	.00698	.00700	.00698
SMOKE NUMBER	13.30	14.58	13.30	28.58	19.30
CORRECTED WEIGHT FLOW	.02104	.02096	.02094	.02099	.02098
SMOKE NUMBER	28.30	31.98	29.58	44.68	36.78
CORRECTED WEIGHT FLOW	.03506	.03492	.03490	.03495	.03483
SMOKE NUMBER	37.30	41.08	38.60	49.48	47.08
CORRECTED WEIGHT FLOW	.04909	.04877	.04885	.04883	.04876
SMOKE NUMBER	43.48	49.40	46.48	56.68	53.88
SMOKE NUMBER AT WA=0.023	38.98	34.78	32.48	43.38	39.58

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75 FUEL=AV. KERO. P BARO= 28.76

DATA POINT NUMBER	76	77	78	79	80
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.952	5.308	3.219	3.951	3.919
UNBURNED HYDROCARBONS	1.350	.742	.892	.054	.056
OXIDES OF NITROGEN	.571	.808	1.244	1.326	1.356
NITRIC OXIDE	.346	.550	1.077	1.170	1.200
POWER LEVEL HP	0.00	75.70	189.67	238.21	253.33
TOTAL CORRECTED HORSEPOWER	0.00	78.68	197.13	248.29	263.38
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	70.124	16.972	16.588	15.470
UNBURNED HYDROCARBONS	0.000	9.808	.484	.228	.221
OXIDES OF NITROGEN	0.000	10.677	6.561	5.567	5.352
NITRIC OXIDE	0.000	7.268	5.679	4.912	4.738

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG. V38 N136 CALC. DATE: 6-11-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.160	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	14.758	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.312	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 6 DATE: 6-11-75 TIME: 1415 BARO. PRESS.: 28.798 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .005808 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	81	82	83	84	85
POWER SETTING, CORRECTED HP.	0.00	78.99	197.35	0.00	45.39
N1 SPEED, RPM	41610.00	41440.00	41110.00	41000.00	40940.00
FUEL FLOW (MEAS.) LB./HR.	138.00	172.00	242.00	262.00	268.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.93	5.49	5.06	6.68	6.51
COMPRESSOR INLET TEMP., DEG. F	59.0	58.0	61.0	59.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	59.71	58.92	57.79	52.78	54.26
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	398.00	392.00	402.00	357.00	363.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.19	1.91
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.55	53.13
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	380.00	384.00
ENGINE EXHAUST GAS TEMP., DEG. F	494.0	615.0	883.0	997.0	1005.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	105.000	64.500	6.600	7.500	4.500
CARBON MONOXIDE (CO), PPMV	239.757	274.834	187.476	259.602	237.311
TOTAL OXIDES OF NITROGEN (NOX), PPMV	18.000	25.000	44.700	51.500	52.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.314	1.787	2.763	3.389	3.389
NITRIC OXIDE (NO), PPMV	10.500	16.300	39.000	46.000	46.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	8.932	4.065	.272	.252	.151
CARBON MONOXIDE (CO)	35.682	38.381	13.526	15.259	13.959
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.408	4.528	5.298	4.972	5.024
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.233	.699	.066	.066	.041
CARBON MONOXIDE (CO)	4.924	5.212	3.273	3.998	3.741
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.607	.779	1.282	1.303	1.346
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.70	189.67	0.00	43.63
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	239.48	209.86
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.70	189.67	239.48	253.49
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.36	98.93	99.66	99.62	99.66
F/A (EMISSIONS)	.006	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75 FUEL=AV. KERO. P BARO= 28.70
RAT SHP= 280. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 40. REL HUM= 49.00 SPEC HUM= .005000
FUEL H/C= 1.9260 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	81	82	83	84	85
PERCENT MAX. CORRECTED POWER	0.0	39.5	98.7	0.0	22.7
CORRECTED SHAFT HP	0.0	79.0	197.4	0.0	45.4
MEASURED SHAFT HP	0.0	75.7	189.7	0.0	43.6
EXHAUST GAS TEMP., DEG.F	494.0	615.0	883.0	997.0	1005.0
SHAFT SPEED, N1, RPM	41610.0	41440.0	41110.0	41000.0	40940.0
COMPRESSOR DSCHG. PRES.,PSIA	59.7	58.9	57.6	52.6	54.3
COMPRESSOR DSCHG. TEMP,DEG F	390.0	392.0	402.0	357.0	363.0
EXHAUST GAS PRESS., PSIA	13.67	13.72	13.85	13.83	13.84
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.281	1.990
COMPRESSOR MAP FLOW,LB/SEC	5.97	5.57	5.88	6.67	6.47
FA RATIO BASED ON MAP FLOW	.0064	.0086	.0132	.0162	.0163
CORRECTED FUEL FLOW , LB/HR	138.0	172.0	242.0	262.0	268.0
FA RATIO CALC. FROM EMISSION	.0065	.0087	.0132	.0162	.0162
EQUIVALENCE RATIO	.095	.128	.194	.237	.237
LOADING W/P**N/V/E(T/540)	.387	.368	.341	.383	.368
COMB EFFIC FROM EMISSIONS	98.377	98.931	99.658	99.619	99.658

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.79	2.76	3.39	3.39
LB. CO2 PER LB. OF FUEL	3.07	3.18	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	424.1	532.4	758.8	819.9	839.3
CARBON MONOXIDE					
PPM BY VOLUME, WET	239.6	274.8	167.5	259.6	237.3
LB. PER 1000 LB. OF FUEL	35.682	38.381	13.526	15.259	13.959
WEIGHT FLOW, LB./HR.	4.924	5.212	3.273	3.998	3.741
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	195.0	64.5	6.6	7.5	4.5
LB. PER 1000 LB. OF FUEL	8.932	4.065	.272	.252	.151
WEIGHT FLOW, LB./HR.	1.233	.699	.066	.066	.041
RATIO LB HC/LB CO	.2503	.1341	.0201	.0165	.0108
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	18.5	16.3	39.8	46.8	46.5
LB. PER 1000 LB. OF FUEL	2.567	2.952	4.622	4.441	4.493
WEIGHT FLOW, LB./HR.	.354	.509	1.119	1.164	1.284
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	7.5	8.7	5.7	5.5	5.5
LB. PER 1000 LB. OF FUEL	1.633	1.576	.676	.531	.531
WEIGHT FLOW, LB./HR.	.253	.271	.163	.139	.142
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	18.8	25.8	44.7	51.5	52.8
LB. PER 1000 LB. OF FUEL	4.488	4.528	5.298	4.972	5.024
WEIGHT FLOW, LB./HR.	.637	.779	1.282	1.303	1.346
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00697	.00697	.00697	.00698	.00698
SMOKE NUMBER	13.30	13.30	12.70	22.90	21.70
CORRECTED WEIGHT FLOW	.02092	.02092	.02091	.02094	.02093
SMOKE NUMBER	28.90	30.10	25.90	39.80	32.50
CORRECTED WEIGHT FLOW	.03491	.03485	.03484	.03489	.03489
SMOKE NUMBER	38.90	42.20	38.00	50.60	45.80
CORRECTED WEIGHT FLOW	.04873	.04868	.04877	.04885	.04885
SMOKE NUMBER	43.40	45.20	43.40	56.60	53.00
SMOKE NUMBER AT MA=0.823	31.30	33.20	30.50	43.00	38.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75 FUEL=AV. KERO. P BARO= 28.78

DATA POINT NUMBER	81	82	83	84	85
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.924	5.212	3.273	3.998	3.741
UNBURNED HYDROCARBONS	1.233	.699	.066	.066	.041
OXIDES OF NITROGEN	.607	.779	1.282	1.303	1.346
NITRIC OXIDE	.354	.508	1.119	1.164	1.204
POWER LEVEL HP	0.00	75.70	189.67	239.48	253.49
TOTAL CORRECTED HORSEPOWER	0.00	78.99	197.35	249.66	264.68
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	68.848	17.258	16.693	14.758
UNBURNED HYDROCARBONS	0.000	9.235	.347	.276	.160
OXIDES OF NITROGEN	0.000	10.287	6.759	5.440	5.312
NITRIC OXIDE	0.000	6.707	5.897	4.859	4.758

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-11-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT ADDITIVES: NONE
ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB.
FUEL: ASTM D1655-73

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.190	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	14.760	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.157	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
MODEL NO.: USER:
AIRCRAFT INSTALLATION *** MFR.:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 6 DATE: 6-11-75 TIME: 3:15 BARO. PRESS.: 28.700 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .005088 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	86	87	88	89	90
POWER SETTING, CORRECTED HP.	0.00	78.77	197.76	0.00	45.97
N1 SPEED, RPM	41610.00	41440.00	41090.00	40990.00	40938.00
FUEL FLOW (MEAS.) LB./HR.	138.00	175.00	242.00	262.00	268.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.80	5.59	5.07	6.66	6.48
COMPRESSOR INLET TEMP., DEG. F	62.0	61.0	61.0	58.8	59.8
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	59.17	58.67	57.94	52.78	54.35
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	392.00	394.00	402.00	356.00	361.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.18	1.91
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.46	53.22
BLEED AIR TEMPERATURE, DEG. F	0.00	0.00	0.00	378.00	382.00
ENGINE EXHAUST GAS TEMP., DEG. F	-0.00	-0.00	-0.00	998.0	1003.0
EMISSION CONCENTRATION, WET ANALYSIS	498.0	621.0	879.0		
HYDROCARBON (HC AS CH4), PPMC	96.000	61.500	6.000	7.500	5.400
CARBON MONOXIDE (CO), PPMV	244.179	269.721	185.167	254.593	239.757
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.800	24.500	43.500	50.500	51.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.347	1.787	2.768	3.401	3.413
NITRIC OXIDE (NO), PPMV	12.600	17.000	38.000	45.000	45.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	7.975	3.877	.247	.251	.188
CARBON MONOXIDE (CO)	35.489	29.751	13.335	14.912	14.000
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.258	4.439	5.146	4.859	4.892
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.101	.679	.060	.066	.048
CARBON MONOXIDE (CO)	4.898	5.206	3.227	3.907	3.752
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.586	.777	1.245	1.273	1.311
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.70	190.06	0.00	44.09
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	237.90	210.11
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.70	190.06	237.90	254.20
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.47	98.96	99.66	99.63	99.65
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 40.
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0
FUEL=AV. KERO. P BARO= 28.78
REL HUM= 49.00 SPEC HUM= .005000
FLO,L/M= 14.160 SL.TIM,S= 6.5000

DATA POINT NUMBER	86	87	88	89	90
PERCENT MAX. CORRECTED POWER	0.0	39.4	98.9	0.0	23.0
CORRECTED SHAFT HP	0.0	78.8	197.8	0.0	46.0
MEASURED SHAFT HP	0.0	75.7	190.1	0.0	44.1
EXHAUST GAS TEMP., DEG.F	498.0	621.0	879.0	998.0	1003.0
SHAFT SPEED, N1, RPM	41610.0	41440.0	41090.0	40990.0	40930.0
COMPRESSOR DSCHG. PRES.,PSIA	59.2	58.7	57.9	52.8	54.4
COMPRESSOR DSCHG. TEMP,DEG F	392.0	394.0	402.0	356.0	361.0
EXHAUST GAS PRESS., PSIA	13.68	13.72	13.85	13.83	13.83
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.271	1.989
COMPRESSOR MAP FLOW,LB/SEC	5.92	5.57	5.03	6.62	6.47
FA RATIO BASED ON MAP FLOW	.0065	.0087	.0134	.0164	.0163
CORRECTED FUEL FLOW , LB/HR	138.0	175.0	242.0	262.0	268.0
FA RATIO CALC. FROM EMISSION	.0066	.0087	.0133	.0162	.0163
EQUIVALENCE RATIO	.097	.127	.194	.238	.239
LOADING W/P**N/V/E(T/540)	.389	.378	.336	.380	.368
COMB EFFIC FROM EMISSIONS	98.466	98.360	99.665	99.627	99.655

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.35	1.79	2.77	3.48	3.41
LB. CO2 PER LB. OF FUEL	3.08	3.10	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	424.5	541.9	758.8	820.8	839.3
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.2	269.7	185.2	254.6	239.8
LB. PER 1000 LB. OF FUEL	35.483	29.751	13.335	14.912	14.088
WEIGHT FLOW, LB./HR.	4.898	5.206	3.227	3.907	3.752
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	96.0	61.5	6.8	7.5	5.4
LB. PER 1000 LB. OF FUEL	7.975	3.877	.247	.251	.188
WEIGHT FLOW, LB./HR.	1.101	.679	.068	.066	.048
RATIO LB HC/LB CO	.2247	.1303	.0185	.0168	.0129
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	12.6	17.8	38.0	45.0	45.5
LB. PER 1000 LB. OF FUEL	3.008	3.080	4.495	4.338	4.364
WEIGHT FLOW, LB./HR.	.415	.539	1.088	1.134	1.170
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	5.2	7.5	5.5	5.5	5.5
LB. PER 1000 LB. OF FUEL	1.241	1.359	.651	.529	.528
WEIGHT FLOW, LB./HR.	.171	.238	.157	.139	.141
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	17.8	24.5	43.5	50.5	51.0
LB. PER 1000 LB. OF FUEL	4.250	4.439	5.146	4.859	4.892
WEIGHT FLOW, LB./HR.	4.586	.777	1.245	1.273	1.311
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00699	.00696	.00695	.00700	.00700
SMOKE NUMBER	14.50	16.70	15.70	22.90	19.30
CORRECTED WEIGHT FLOW	.02096	.02088	.02090	.02099	.02101
SMOKE NUMBER	31.30	32.50	30.10	41.60	38.60
CORRECTED WEIGHT FLOW	.03481	.03481	.03484	.03495	.03501
SMOKE NUMBER	39.20	43.40	36.70	48.80	44.60
CORRECTED WEIGHT FLOW	.04873	.04873	.04886	.04903	.04901
SMOKE NUMBER	44.60	47.00	43.40	68.20	50.00
SMOKE NUMBER AT WA=0.023	32.80	35.90	31.90	43.90	38.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-11-75 FUEL=AV. KERD. P BARO= 28.78

DATA POINT NUMBER	86	87	88	89	90
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.898	5.206	3.227	3.907	3.752
UNBURNED HYDROCARBONS	1.191	.679	.068	.066	.048
OXIDES OF NITROGEN	.586	.777	1.245	1.273	1.311
NITRIC OXIDE	.415	.539	1.088	1.134	1.170
POWER LEVEL HP	0.00	75.70	190.06	237.90	254.20
TOTAL CORRECTED HORSEPOWER	0.00	78.77	197.76	247.77	265.01
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	68.776	16.980	16.423	14.760
UNBURNED HYDROCARBONS	0.000	8.963	.314	.277	.190
OXIDES OF NITROGEN	0.000	10.262	6.552	5.351	5.157
NITRIC OXIDE	0.000	7.121	5.724	4.768	4.601

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-12-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.322	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	16.726	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.823	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 7 DATE: 6-12-75 TIME: BARO. PRESS.: 28.708 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .007508 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 380.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	91	92	93	94	95
POWER SETTING, CORRECTED HP.	0.00	78.99	197.59	0.00	45.55
N1 SPEED, RPM	41600.00	41480.00	41160.00	41030.00	40960.00
FUEL FLOW (MEAS.) LB./HR.	140.00	178.00	240.00	265.00	274.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.01	5.75	5.11	6.86	6.61
COMPRESSOR INLET TEMP., DEG. F	61.0	59.0	61.0	58.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.13	60.15	59.17	53.37	55.24
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	382.00	384.00	392.00	351.00	351.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.26	1.97
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	52.10	53.91
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	370.00	371.00
ENGINE EXHAUST GAS TEMP., DEG. F	483.0	600.0	855.0	992.0	993.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	123.000	70.500	8.700	5.400	9.000
CARBON MONOXIDE (CO), PPMV	244.179	273.606	192.110	213.236	267.179
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	22.500	39.500	49.400	46.900
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.314	1.765	2.725	3.352	3.432
NITRIC OXIDE (NO), PPMV	9.000	13.600	33.300	43.500	41.800
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.446	4.496	.364	.184	.298
CARBON MONOXIDE (CO)	36.280	30.552	14.849	12.668	15.503
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.661	4.124	4.745	4.828	4.478
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.462	.808	.887	.849	.882
CARBON MONOXIDE (CO)	5.079	5.438	3.372	3.362	4.248
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.513	.734	1.139	1.280	1.225
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.77	189.90	0.00	43.65
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	239.97	218.32
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.77	189.90	239.97	253.96
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.23	98.89	99.64	99.69	99.61
F/A (EMISSIONS)	.006	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-79 FUEL=AV.KERO. P BARO= 28.78
RAT SHP= 280. RA EGT,F= 1150. RAT SPD= 41000. DEW PT,F= 50. REL HUM= 49.00 SPEC HUM= .007500
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18478. S LN T,F= 388.8 FLO.L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	91	92	93	94	95
PERCENT MAX. CORRECTED POWER	0.0	39.5	98.8	0.0	22.6
CORRECTED SHAFT HP	0.0	79.0	197.6	0.0	45.5
MEASURED SHAFT HP	0.0	75.6	189.9	0.0	43.6
EXHAUST GAS TEMP., DEG.F	483.0	688.0	895.0	992.0	993.0
SHAFT SPEED, N1, RPM	41680.0	41480.0	41160.0	41038.0	40968.0
COMPRESSOR DSCHG. PRES.,PSIA	61.1	60.1	59.2	58.4	55.2
COMPRESSOR DSCHG. TEMP.DEG F	382.0	384.0	392.0	351.0	351.0
EXHAUST GAS PRESS., PSIA	13.67	13.73	13.84	13.84	13.83
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.349	2.052
COMPRESSOR MAP FLOW,LB/SEC	6.09	5.67	5.16	6.67	6.59
FA RATIO BASED ON MAP FLOW	.0064	.0067	.0129	.0167	.0165
CORRECTED FUEL FLOW , LB/HR	148.0	178.0	240.0	265.0	274.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0131	.0168	.0164
EQUIVALENCE RATIO	.095	.126	.191	.234	.240
LOADING W/P**N/V/E(T/548)	.384	.367	.348	.374	.369
COMB EFFIC FROM EMISSIONS	98.230	98.887	99.638	99.685	99.689

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.76	2.72	3.35	3.43
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	429.6	550.7	751.4	838.4	857.3
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.2	273.8	192.1	213.2	267.2
LB. PER 1000 LB. OF FUEL	36.260	38.592	14.849	12.686	19.583
WEIGHT FLOW, LB./HR.	5.379	5.436	3.372	3.362	4.248
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	123.0	70.5	8.7	9.4	9.8
LB. PER 1000 LB. OF FUEL	18.446	4.496	.364	.184	.298
WEIGHT FLOW, LB./HR.	1.462	.889	.087	.049	.082
RATIO LB HC/LB CO	.2879	.1472	.0259	.0145	.0193
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.8	13.8	33.3	43.5	41.8
LB. PER 1000 LB. OF FUEL	2.197	2.529	4.888	4.252	3.984
WEIGHT FLOW, LB./HR.	.388	.498	.968	1.127	1.092
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	8.8	8.7	8.2	9.9	9.1
LB. PER 1000 LB. OF FUEL	1.464	1.595	.745	.577	.486
WEIGHT FLOW, LB./HR.	.295	.284	.179	.153	.133
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.8	22.5	39.5	49.4	46.9
LB. PER 1000 LB. OF FUEL	3.661	4.124	4.745	4.828	4.470
WEIGHT FLOW, LB./HR.	.513	.734	1.139	1.280	1.225
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08708	.08706	.08705	.08703	.08702
SMOKE NUMBER	16.90	19.90	18.80	27.10	21.70
CORRECTED WEIGHT FLOW	.02124	.02119	.02118	.02109	.02105
SMOKE NUMBER	29.50	32.50	28.90	42.20	39.80
CORRECTED WEIGHT FLOW	.03539	.03532	.03515	.03507	.03506
SMOKE NUMBER	39.80	44.60	39.80	51.80	49.80
CORRECTED WEIGHT FLOW	.04965	.04963	.04921	.04908	.04906
SMOKE NUMBER	48.20	51.80	47.80	61.40	57.80
SMOKE NUMBER AT WA=0.823	33.80	37.50	32.80	46.80	41.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-79 FUEL=AV.KERO. P BARO= 28.78

DATA POINT NUMBER	91	92	93	94	95
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.879	5.438	3.372	3.362	4.248
UNBURNED HYDROCARBONS	1.462	.888	.887	.849	.882
OXIDES OF NITROGEN	.513	.734	1.139	1.288	1.229
NITRIC OXIDE	.309	.458	.968	1.127	1.092
POWER LEVEL MP	0.00	75.77	189.98	239.97	253.96
TOTAL CORRECTED HORSEPOWER	0.00	78.99	197.59	249.93	264.59
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	71.778	17.755	14.812	16.726
UNBURNED HYDROCARBONS	0.000	10.562	.468	.283	.322
OXIDES OF NITROGEN	0.000	9.695	5.997	5.332	4.823
NITRIC OXIDE	0.000	5.942	5.056	4.695	4.298

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PWA LACCE INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-12-75
MODEL NO.: GTCP85-98CK S/NO: 36179 ENGINE TYPE (GLASS): APU CALC. I.D.: E
MAX SHP 288. ; BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 9 **********

HYDROCARBONS (HC AS CH4) .336 LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO) 16.838 LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2) 5.006 LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: F DATE: 6-12-75 TIME: 18.18 BARO. PRESS.: 28.718 IN. HGA.
AMBIENT AIR TEMP.: 98.0 DEG. F RELATIVE HUMIDITY: 78.00 PERCENT SPECIFIC HUMIDITY: .0BF508 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 881.83 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.98 SEC. LENGTH: 98.88 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	96	97	98	99	100
POWER SETTING, CORRECTED HP.	0.00	78.91	197.95	0.00	45.46
N1 SPEED, RPM	41626.00	41458.00	41138.00	41008.00	40948.00
FUEL FLOW (MEAS.) LB./HR.	140.00	177.00	242.00	265.00	275.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.98	5.71	5.10	6.00	6.04
COMPRESSOR INLET TEMP., DEG. F	58.0	59.0	58.0	58.0	59.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.13	60.10	59.26	53.37	55.24
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	378.00	384.00	398.00	348.00	351.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.24	1.97
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	52.14	53.91
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	368.00	369.00
ENGINE EXHAUST GAS TEMP., DEG. F	402.0	608.0	858.0	993.0	989.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	115.500	78.530	9.008	5.780	9.380
CARBON MONOXIDE (CO), PPMV	243.606	273.888	189.798	217.999	264.644
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.998	22.998	39.588	48.588	47.998
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.323	1.768	2.789	3.389	3.419
NITRIC OXIDE (NO), PPMV	11.798	15.488	34.288	43.588	42.008
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.756	4.685	.376	.192	.318
CARBON MONOXIDE (CO)	36.818	32.477	18.963	12.838	15.412
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.859	4.187	4.773	4.689	4.582
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.366	.794	.092	.051	.085
CARBON MONOXIDE (CO)	5.841	5.394	3.379	3.400	4.238
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.540	.741	1.155	1.242	1.260
ENGINE WORK OUTPUT, MEAS. SHP	0.00	79.72	189.76	0.00	43.63
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	237.30	288.09
ENGINE WORK OUTPUT, TOTAL HP	0.00	79.72	189.76	237.30	291.72
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.30	98.89	99.64	99.68	99.61
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-79 FUEL=AV.KERO. P BARO= 28.71

RAT SHP= 200. RA EGT,F= 1158. RAT SPD= 41680. DEW PT,F= 58. REL HUM= 78.00 SPEC HUM= .007980

FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO,L/M= 14.160 SL TIM.S= 6.5000

DATA POINT NUMBER	96	97	98	99	100
PERCENT MAX. CORRECTED POWER	0.0	39.5	99.0	0.0	22.7
CORRECTED SHAFT HP	0.0	78.9	198.0	0.0	45.5
MEASURED SHAFT HP	0.0	75.7	189.6	0.0	43.6
EXHAUST GAS TEMP., DEG.F	482.0	600.0	850.0	993.0	989.0
SHAFT SPEED, N1, RPM	41620.0	41450.0	41130.0	41080.0	40940.0
COMPRESSOR DSCHG. PRES.,PSIA	61.1	60.1	59.3	53.4	55.2
COMPRESSOR DSCHG. TEMP,DEG F	378.0	384.0	398.0	368.0	351.0
EXHAUST GAS PRESS., PSIA	13.67	13.73	13.84	13.84	13.83
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.337	2.051
COMPRESSOR MAP FLOW,LB/SEC	6.57	5.67	5.15	6.72	6.52
FA RATIO BASED ON MAP FLOW	.0064	.0067	.0131	.0165	.0168
CORRECTED FUEL FLOW , LB/HR	140.0	177.0	242.0	265.0	275.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0138	.0162	.0163
EQUIVALENCE RATIO	.035	.126	.190	.237	.240
LOADING W/P**N/V/E(T/540)	.386	.368	.336	.381	.363
COMB EFFIC FROM EMISSIONS	98.297	98.898	99.638	99.681	99.610

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.32	1.77	2.71	3.39	3.42
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	429.9	547.6	757.7	838.3	868.5
CARBON MONOXIDE					
PPM BY VOLUME, WET	243.7	273.8	189.8	218.0	264.6
LB. PER 1000 LB. OF FUEL	36.810	30.477	13.963	12.830	15.412
WEIGHT FLOW, LB./HR.	5.041	5.394	3.379	3.400	4.238
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	115.5	78.5	9.0	5.7	9.3
LB. PER 1000 LB. OF FUEL	9.736	4.485	.378	.192	.318
WEIGHT FLOW, LB./HR.	1.366	.794	.092	.051	.085
RATIO LB HC/LB CO	.2709	.1472	.0271	.0149	.0201
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.7	15.4	34.2	43.5	42.8
LB. PER 1000 LB. OF FUEL	2.848	2.816	4.133	4.285	4.018
WEIGHT FLOW, LB./HR.	.398	.498	1.008	1.114	1.105
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	4.2	7.9	5.3	9.8	9.9
LB. PER 1000 LB. OF FUEL	1.019	1.371	.648	.483	.564
WEIGHT FLOW, LB./HR.	.143	.243	.155	.128	.155
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.9	22.9	39.5	48.5	47.9
LB. PER 1000 LB. OF FUEL	3.859	4.187	4.773	4.689	4.582
WEIGHT FLOW, LB./HR.	.540	.741	1.155	1.242	1.260
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08791	.08709	.08781	.08784	.08784
SMOKE NUMBER	19.10	16.90	16.90	28.50	24.10
CORRECTED WEIGHT FLOW	.02184	.02188	.02183	.02111	.02111
SMOKE NUMBER	32.50	32.50	28.90	45.80	39.80
CORRECTED WEIGHT FLOW	.03585	.03523	.03502	.03515	.03514
SMOKE NUMBER	41.00	43.40	41.00	54.20	49.40
CORRECTED WEIGHT FLOW	.04987	.04894	.04902	.04917	.04920
SMOKE NUMBER	49.40	48.80	48.80	57.80	57.80
SMOKE NUMBER AT WA=0.823	35.60	35.60	34.30	45.80	43.10

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 30179 COMB P/N= 698168-3 TEST DATE 6-12-75 FUEL=AV.KERO. P BARO= 28.71

DATA POINT NUMBER	96	97	98	99	100
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.041	3.394	3.379	3.408	4.238
UNBURNED HYDROCARBONS	1.366	.794	.092	.091	.085
OXIDES OF NITROGEN	.540	.741	1.155	1.242	1.268
NITRIC OXIDE	.398	.496	1.088	1.114	1.185
POWER LEVEL HP	0.00	75.72	189.76	237.38	251.72
TOTAL CORRECTED HORSEPOWER	0.00	78.91	197.95	247.86	262.33
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	71.248	17.086	14.327	16.838
UNBURNED HYDROCARBONS	0.000	16.485	.463	.214	.338
OXIDES OF NITROGEN	0.000	9.767	6.087	5.236	5.036
NITRIC OXIDE	0.000	6.582	5.271	4.696	4.389

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACCZ INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-12-79
MODEL NO.: GTCP85-98CK S/N: 36197 ENGINE TYPE (CLASS): APU CALC. I.D.: B
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.318	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	16.688	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.982	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 7 DATE: 6-12-79 TIME: 11:05 BARO. PRESS.: 28.718 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007588 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.58 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	101	102	103	104	105
POWER SETTING, CORRECTED HP.	0.00	78.91	197.86	0.00	45.49
N1 SPEED, RPM	41620.00	41450.00	41150.00	41030.00	40960.00
FUEL FLOW (MEAS.) LB./HR.	100.00	178.00	242.00	265.00	274.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.96	5.73	5.12	6.81	6.59
COMPRESSOR INLET TEMP., DEG. F	58.0	59.0	59.0	58.0	59.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.00	60.10	59.17	53.32	55.19
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	379.00	384.00	391.00	349.00	352.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.24	1.97
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	52.14	53.91
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	369.00	372.00
ENGINE EXHAUST GAS TEMP., DEG. F	602.0	602.0	845.0	987.0	991.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	117.000	69.000	8.700	6.000	8.700
CARBON MONOXIDE (CO), PPMV	244.671	271.251	191.161	228.398	267.179
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.900	23.000	39.500	48.000	47.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.327	1.773	2.741	3.376	3.444
NITRIC OXIDE (NO), PPMV	12.100	19.000	33.000	43.000	42.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.891	4.380	.362	.283	.288
CARBON MONOXIDE (CO)	36.848	38.125	13.899	13.816	15.448
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.847	4.196	4.717	4.734	4.548
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.379	.788	.887	.854	.879
CARBON MONOXIDE (CO)	5.846	5.362	3.364	3.449	4.233
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.539	.747	1.142	1.255	1.244
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.72	189.85	0.00	43.65
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	237.95	210.11
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.72	189.85	237.95	253.75
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.29	98.91	99.64	99.68	99.61
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36197 COMB P/N= 698168-3 TEST DATE 6-12-79 FUEL=AV. KERO. P BARO= 28.71
RAT SHP= 280. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 58. REL HUM= 70.00 SPEC HUM= .007588
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18478. S LN T,F= 380.0 FLO,L/M= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	181	182	183	184	185
PERCENT MAX. CORRECTED POWER	0.0	39.5	98.9	0.0	22.7
CORRECTED SHAFT HP	0.0	78.9	197.9	0.0	45.5
MEASURED SHAFT HP	0.0	75.7	189.9	0.0	43.6
EXHAUST GAS TEMP., DEG.F	482.0	602.0	845.0	987.0	991.0
SHAFT SPEED, N1, RPM	41620.0	41450.0	41150.0	41038.0	40960.0
COMPRESSOR DSCHG. PRES.,PSIA	61.1	60.1	59.2	53.3	55.2
COMPRESSOR DSCHG. TEMP,DEG F	379.0	384.0	391.0	349.0	352.0
EXHAUST GAS PRESS., PSIA	13.67	13.73	13.85	13.84	13.83
CORRECTED BLEED FLOW, LB/SEC	0.000	0.282	0.000	2.336	2.051
COMPRESSOR MAP FLOW,LB/SEC	6.85	5.67	5.15	6.67	6.57
FA RATIO BASED ON MAP FLOW	.0064	.0087	.0131	.0166	.0165
CORRECTED FUEL FLOW , LB/HR	140.0	178.0	242.0	265.0	274.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0131	.0161	.0165
EQUIVALENCE RATIO	.096	.127	.192	.236	.241
LOADING W/P**N/V/E(T/540)	.146	.139	.128	.143	.139
COMB EFFIC FROM EMISSIONS	98.288	98.907	99.641	99.676	99.611

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.33	1.77	2.74	3.38	3.44
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	429.9	550.9	757.8	830.3	857.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.7	271.3	191.2	228.4	267.2
LB. PER 1000 LB. OF FUEL	36.848	38.125	13.899	13.016	15.448
WEIGHT FLOW, LB./HR.	5.066	5.362	3.364	3.449	4.233
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	117.8	69.8	8.7	6.8	8.7
LB. PER 1000 LB. OF FUEL	9.891	4.380	.362	.283	.288
WEIGHT FLOW, LB./HR.	1.379	.788	.887	.854	.879
RATIO LB HC/LB CO	.2733	.1454	.0260	.0156	.0186
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	12.1	15.8	33.8	43.9	42.3
LB. PER 1000 LB. OF FUEL	2.928	2.882	3.941	4.259	4.017
WEIGHT FLOW, LB./HR.	.410	.513	.954	1.129	1.101
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.8	7.2	6.5	6.9	5.5
LB. PER 1000 LB. OF FUEL	.919	1.313	.776	.675	.522
WEIGHT FLOW, LB./HR.	.129	.234	.188	.126	.143
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.9	23.0	39.5	48.8	47.8
LB. PER 1000 LB. OF FUEL	3.847	4.196	4.717	4.734	4.540
WEIGHT FLOW, LB./HR.	.539	.767	1.142	1.255	1.244
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00704	.00703	.00702	.00702	.00700
SMOKE NUMBER	15.70	16.90	21.70	24.10	28.50
CORRECTED WEIGHT FLOW	.02112	.02108	.02105	.02105	.02101
SMOKE NUMBER	32.50	31.90	33.70	44.60	41.00
CORRECTED WEIGHT FLOW	.03519	.03509	.03508	.03506	.03500
SMOKE NUMBER	39.80	41.00	35.80	51.60	50.60
CORRECTED WEIGHT FLOW	.04925	.04912	.04911	.04908	.04900
SMOKE NUMBER	45.80	49.40	49.20	48.20	56.60
SMOKE NUMBER AT WA=0.023	33.80	35.20	35.40	45.60	42.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36197 COMB P/N= 698168-3 TEST DATE 6-12-75 FUEL=AV. KERO. P BARO= 28.71

DATA POINT NUMBER	101	102	103	104	105
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.046	5.362	3.364	3.449	4.233
UNBURNED HYDROCARBONS	1.379	.788	.087	.054	.079
OXIDES OF NITROGEN	.539	.747	1.142	1.255	1.244
NITRIC OXIDE	.410	.513	.954	1.129	1.101
POWER LEVEL HP	0.00	75.72	189.85	237.95	253.75
TOTAL CORRECTED HORSEPOWER	0.00	78.91	197.84	247.74	264.45
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	70.818	17.717	14.496	16.688
UNBURNED HYDROCARBONS	0.000	10.297	.461	.226	.318
OXIDES OF NITROGEN	0.000	9.864	6.013	5.272	4.902
NITRIC OXIDE	0.000	6.776	5.023	4.743	4.338

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-12-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.429 LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.511 LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.623 LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698166-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 0 DATE: 6-12-75 TIME: 13.45 BARO. PRESS.: 28.718 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .016000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	106	107	108	109	110
POWER SETTING, CORRECTED HP.	0.00	78.76	197.57	0.00	45.35
N1 SPEED, RPM	41590.00	41410.00	41090.00	40960.00	40880.00
FUEL FLOW (MEAS.) LB./HR.	143.00	178.00	246.00	265.00	272.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.01	5.75	5.27	6.01	6.60
COMPRESSOR INLET TEMP., DEG. F	61.0	60.0	59.0	59.0	60.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.23	60.46	59.66	53.27	55.24
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	371.00	371.00	379.00	336.00	341.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.30	2.02
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	52.00	54.11
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	359.00	361.00
ENGINE EXHAUST GAS TEMP., DEG. F	478.0	588.0	843.0	1000.0	995.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	132.000	75.000	10.500	6.000	12.000
CARBON MONOXIDE (CO), PPMV	2471.140	273.000	197.699	222.307	279.983
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	22.100	38.000	47.900	45.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.343	1.765	2.703	3.419	3.451
NITRIC OXIDE (NO), PPMV	8.100	14.000	33.000	43.000	40.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.967	4.782	.442	.200	.396
CARBON MONOXIDE (CO)	35.925	30.544	14.568	12.964	16.152
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.582	4.050	4.600	4.588	4.264
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.568	.851	.109	.053	.108
CARBON MONOXIDE (CO)	5.137	5.437	3.584	3.435	4.393
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.512	.721	1.132	1.216	1.160
ENGINE WORK OUTPUT, MEAS. SHP	0.00	79.65	189.58	0.00	43.56
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	235.17	287.32
ENGINE WORK OUTPUT, TOTAL HP	0.00	79.65	189.58	235.17	250.88
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.19	98.86	99.62	99.68	99.59
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698169-3 TEST DATE 6-12-75 FUEL=AV. KERO. P BARO= 28.71
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41608. DEW PT,F= 57. REL HUM= 95.00 SPEC HUM= .010000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LH T,F= 388.8 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	186	187	188	189	110
PERCENT MAX. CORRECTED POWER	0.0	39.4	98.6	0.0	22.7
CORRECTED SHAFT HP	0.0	78.8	197.6	0.0	45.4
MEASURED SHAFT HP	0.0	79.6	189.6	0.0	43.6
EXHAUST GAS TEMP., DEG.F	478.0	588.0	843.0	1000.0	995.0
SHAFT SPEED, N1, RPM	41598.0	41410.0	41090.0	40960.0	40880.0
COMPRESSOR DSCHG. PRES.,PSIA	61.2	68.9	59.7	53.3	55.2
COMPRESSOR DSCHG. TEMP,DEG F	371.0	371.0	379.0	336.0	341.0
EXHAUST GAS PRESS., PSIA	13.66	13.73	13.85	13.84	13.84
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.396	2.107
COMPRESSOR MAP FLOW,LB/SEC	6.10	5.72	5.20	6.68	6.62
FA RATIO BASED ON MAP FLOW	.0065	.0086	.0131	.0160	.0164
CORRECTED FUEL FLOW , LB/HR	143.0	178.0	246.0	265.0	272.0
FA RATIO CALC. FROM EMISSION	.0066	.0086	.0133	.0163	.0165
EQUIVALENCE RATIO	.097	.126	.198	.239	.242
LOADING W/P**N/V/E(T/540)	.392	.371	.345	.384	.374
COMB EFFIC FROM EMISSIONS	98.193	98.862	99.618	99.677	99.585

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.34	1.76	2.70	3.42	3.45
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	438.6	550.5	770.0	830.3	850.7
CARBON MONOXIDE					
PPM BY VOLUME, WET	247.1	273.0	197.7	222.3	280.0
LB. PER 1000 LB. OF FUEL	35.925	30.544	14.568	12.964	16.152
WEIGHT FLOW, LB./HR.	5.137	5.437	3.584	3.435	4.393
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	132.0	75.0	10.5	6.0	12.0
LB. PER 1000 LB. OF FUEL	10.967	4.782	.442	.208	.396
WEIGHT FLOW, LB./HR.	1.568	.851	.109	.053	.108
RATIO LB HC/LB CO	.3053	.1566	.0304	.0154	.0245
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	8.1	14.8	33.8	43.8	40.8
LB. PER 1000 LB. OF FUEL	1.934	2.565	3.994	4.119	3.866
WEIGHT FLOW, LB./HR.	.277	.457	.983	1.092	1.052
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.9	8.1	5.8	4.9	4.2
LB. PER 1000 LB. OF FUEL	1.648	1.484	.685	.469	.398
WEIGHT FLOW, LB./HR.	.236	.264	.169	.124	.108
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.0	22.1	38.8	47.9	45.8
LB. PER 1000 LB. OF FUEL	3.582	4.050	4.680	4.588	4.264
WEIGHT FLOW, LB./HR.	.512	.721	1.132	1.216	1.160
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00701	.00700	.00698	.00698	.00698
SMOKE NUMBER	14.50	16.70	14.50	25.90	24.10
CORRECTED WEIGHT FLOW	.02134	.02100	.02094	.02094	.02094
SMOKE NUMBER	31.30	32.50	31.90	46.40	42.20
CORRECTED WEIGHT FLOW	.03499	.03497	.03489	.03485	.03487
SMOKE NUMBER	40.40	44.60	43.40	55.40	50.00
CORRECTED WEIGHT FLOW	.04699	.04694	.04685	.04679	.04681
SMOKE NUMBER	47.00	49.40	47.60	65.10	61.40
SMOKE NUMBER AT WA=0.023	33.70	36.70	34.80	48.80	45.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-75 FUEL=AV. KERO. P BARO= 28.71

DATA POINT NUMBER	106	107	108	109	110
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.137	5.437	3.584	3.435	4.393
UNBURNED HYDROCARBONS	1.568	.851	.109	.053	.108
OXIDES OF NITROGEN	.512	.721	1.132	1.216	1.160
NITRIC OXIDE	.277	.457	.983	1.092	1.052
POWER LEVEL HP	0.00	75.65	189.58	235.17	250.88
TOTAL CORRECTED HORSEPOWER	0.00	78.76	197.57	245.88	261.62
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	71.873	18.904	14.608	17.511
UNBURNED HYDROCARBONS	0.000	11.253	.574	.225	.429
OXIDES OF NITROGEN	0.000	9.529	5.969	5.170	4.623
NITRIC OXIDE	0.000	6.037	5.183	4.641	4.192

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-12-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.375	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.160	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.738	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 8 DATE: 6-12-75 TIME: 1450 BARO. PRESS.: 28.710 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	111	112	113	114	115
POWER SETTING, CORRECTED HP.	0.00	79.19	197.76	0.00	45.33
N1 SPEED, RPM	41590.00	41410.00	41090.00	40950.00	40900.00
FUEL FLOW (MEAS.) LB./HR.	140.00	176.00	242.00	266.00	272.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.94	5.72	5.22	6.77	6.60
COMPRESSOR INLET TEMP., DEG. F	60.0	61.0	58.0	60.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.37	60.64	59.75	53.03	55.24
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	370.00	376.00	388.00	338.00	342.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.30	2.02
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	52.05	53.91
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	360.00	363.00
ENGINE EXHAUST GAS TEMP., DEG. F	476.0	595.0	842.0	1083.0	1082.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	124.500	72.000	10.500	5.700	10.500
CARBON MONOXIDE (CO), PPMV	246.152	273.296	208.505	215.616	274.834
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.400	22.000	38.500	49.200	46.200
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.331	1.773	2.687	3.463	3.451
NITRIC OXIDE (NO), PPMV	11.000	14.500	33.000	45.000	41.800
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.444	4.569	.445	.188	.346
CARBON MONOXIDE (CO)	36.126	30.344	14.861	12.419	15.858
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.713	4.012	4.687	4.655	4.379
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.462	.813	.108	.050	.094
CARBON MONOXIDE (CO)	5.058	5.401	3.596	3.303	4.313
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.520	.714	1.134	1.238	1.191
ENGINE WORK OUTPUT, MEAS. SHP	0.00	76.13	189.58	0.00	43.58
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	234.90	207.78
ENGINE WORK OUTPUT, TOTAL HP	0.00	76.13	189.58	234.90	251.36
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.23	98.89	99.61	99.69	99.60
F/A (EMISSIONS)	.007	.009	.013	.017	.016

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-75 FUEL=AV. KERO. P BARO= 28.71
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. OEM PT,F= 57. REL HUM= 95.00 SPEC HUM= .010000
FUEL H/C= 1.9280 STOI F/A= .06922 L H V= 18470. S LN T,F= 380.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	111	112	113	114	115
PERCENT MAX. CORRECTED POWER	0.0	39.6	98.9	0.0	22.7
CORRECTED SHAFT HP	0.0	79.2	197.8	0.0	45.3
MEASURED SHAFT HP	0.0	76.1	189.6	0.0	43.6
EXHAUST GAS TEMP., DEG.F	476.0	595.0	842.0	1083.0	1002.0
SHAFT SPEED, N1, RPM	41590.0	41410.0	41090.0	40950.0	40980.0
COMPRESSOR DSCHG. PRES.,PSIA	61.4	60.6	59.8	53.8	55.2
COMPRESSOR DSCHG. TEMP,DEG F	370.0	376.0	380.8	338.8	342.0
EXHAUST GAS PRESS., PSIA	13.66	13.73	13.86	13.84	13.84
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.395	2.187
COMPRESSOR MAP FLOW,LB/SEC	6.87	5.77	5.18	6.69	6.63
FA RATIO BASED ON MAP FLOW	.0064	.0086	.0130	.0168	.0164
CORRECTED FUEL FLOW , LB/HR	140.0	178.0	242.0	266.0	272.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0129	.0165	.0165
EQUIVALENCE RATIO	.096	.127	.189	.242	.242
LOADING W/P**N/V/E(T/548)	.389	.374	.341	.386	.374
COMB EFFIC FROM EMISSIONS	98.234	98.865	99.611	99.691	99.597

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.33	1.77	2.69	3.46	3.45
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	429.6	550.7	757.3	833.7	850.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	246.2	273.3	200.5	215.6	274.8
LB. PER 1000 LB. OF FUEL	36.126	30.344	14.861	12.419	15.858
WEIGHT FLOW, LB./HR.	5.058	5.401	3.596	3.303	4.313
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	124.5	72.0	18.5	9.7	18.5
LB. PER 1000 LB. OF FUEL	10.444	4.569	.445	.188	.346
WEIGHT FLOW, LB./HR.	1.462	.813	.108	.058	.094
RATIO LB HC/LB CO	.2891	.1506	.0299	.0151	.0218
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.0	14.5	33.0	45.0	41.0
LB. PER 1000 LB. OF FUEL	2.652	2.644	4.018	4.258	3.962
WEIGHT FLOW, LB./HR.	.371	.471	.972	1.133	1.078
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	4.4	7.5	5.5	4.2	4.4
LB. PER 1000 LB. OF FUEL	1.061	1.368	.670	.397	.417
WEIGHT FLOW, LB./HR.	.149	.243	.162	.106	.113
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.4	22.0	38.5	49.2	46.2
LB. PER 1000 LB. OF FUEL	3.713	4.012	4.687	4.655	4.379
WEIGHT FLOW, LB./HR.	.520	.714	1.134	1.238	1.191
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00698	.00697	.00697	.00697	.00697
SMOKE NUMBER	13.90	18.10	18.10	25.90	24.10
CORRECTED WEIGHT FLOW	.02096	.02091	.02091	.02090	.02090
SMOKE NUMBER	32.50	34.90	33.70	45.60	41.00
CORRECTED WEIGHT FLOW	.03492	.03483	.03483	.03480	.03482
SMOKE NUMBER	42.20	42.80	43.40	55.40	53.00
CORRECTED WEIGHT FLOW	.04880	.04876	.04873	.04871	.04875
SMOKE NUMBER	48.20	49.40	49.40	63.90	60.20
SMOKE NUMBER AT MA=0.823	34.70	36.80	36.60	48.30	45.20

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-12-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: Z
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.375	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.160	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.738	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 8 DATE: 6-12-75 TIME: 14:50 BARO. PRESS.: 28.710 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .010008 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	111	112	113	114	115
POWER SETTING, CORRECTED HP.	0.00	79.19	197.76	0.00	45.33
N1 SPEED, RPM	41590.00	41410.00	41090.00	40950.00	40900.00
FUEL FLOW (MEAS.) LB./HR.	140.00	178.00	242.00	266.00	272.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.94	5.72	5.22	6.77	6.68
COMPRESSOR INLET TEMP., DEG. F	60.0	61.0	58.0	60.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.37	60.64	59.75	53.83	55.24
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	370.00	376.00	380.00	336.00	342.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.30	2.02
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	52.05	53.91
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	360.00	363.00
ENGINE EXHAUST GAS TEMP., DEG. F	476.0	595.0	842.0	1803.0	1802.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	124.500	72.000	10.500	5.700	10.500
CARBON MONOXIDE (CO), PPMV	246.152	273.296	208.505	215.616	274.834
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.400	22.000	38.500	49.200	46.200
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.331	1.773	2.687	3.463	3.451
NITRIC OXIDE (NO), PPMV	11.000	14.500	33.000	45.000	41.800
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.444	4.569	.445	.188	.346
CARBON MONOXIDE (CO)	36.126	38.344	14.861	12.419	15.858
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.718	4.812	4.687	4.655	4.379
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.462	.813	.108	.050	.094
CARBON MONOXIDE (CO)	5.058	5.481	3.596	3.303	4.313
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.520	.714	1.134	1.238	1.191
ENGINE WORK OUTPUT, MEAS. SHP	0.00	76.13	189.58	0.00	43.58
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	234.98	287.78
ENGINE WORK OUTPUT, TOTAL HP	0.00	76.13	189.58	234.98	251.36
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.23	98.89	99.61	99.69	99.68
F/A (EMISSIONS)	.007	.009	.013	.017	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-75 FUEL=AV. KERO. P BARO= 28.71
RAT SHP= 288. RA EGT,F= 1198. RAT SPD= 41688. GEN PT,F= 57. REL HUM= 99.00 SPEC HUM= .010000
FUEL W/G= 1.9288 STOI F/A= .066522 L H V= 18478. S LN T,F= 308.0 FLO,L/H= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	111	112	113	114	115
PERCENT MAX. CORRECTED POWER	0.0	39.6	98.9	0.0	22.7
CORRECTED SHAFT HP	0.0	79.2	197.8	0.0	45.3
MEASURED SHAFT HP	0.0	78.1	189.6	0.0	43.6
EXHAUST GAS TEMP., DEG.F	476.0	595.0	842.0	1003.0	1002.0
SHAFT SPEED, N1, RPM	41590.0	41410.0	41090.0	40950.0	40980.0
COMPRESSOR DSCHG. PRES.,PSIA	61.4	68.6	59.8	53.8	55.2
COMPRESSOR DSCHG. TEMP,DEG F	378.0	376.0	368.0	338.0	342.0
EXHAUST GAS PRESS., PSIA	13.66	13.73	13.86	13.84	13.84
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.395	2.187
COMPRESSOR MAP FLOW,LB/SEC	6.07	5.77	5.18	6.69	6.63
FA RATIO BASED ON MAP FLOW	.0064	.0086	.0138	.0160	.0164
CORRECTED FUEL FLOW , LB/HR	140.0	178.0	242.0	266.0	272.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0129	.0165	.0165
EQUIVALENCE RATIO	.096	.127	.189	.242	.242
LOADING W/P**N/V/E(T/548)	.389	.374	.341	.386	.374
COMB EFFIC FROM EMISSIONS	98.284	98.868	99.611	99.691	99.597

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.83	1.77	2.69	3.46	3.45
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	429.6	550.7	757.3	833.7	850.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	246.2	273.3	200.9	219.6	274.8
LB. PER 1000 LB. OF FUEL	36.126	38.344	14.861	12.419	15.858
WEIGHT FLOW, LB./HR.	5.058	5.481	3.906	3.383	4.313
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	124.9	72.8	18.9	9.7	18.5
LB. PER 1000 LB. OF FUEL	18.444	4.569	.445	.188	.346
WEIGHT FLOW, LB./HR.	1.462	.813	.188	.058	.094
RATIO LB HC/LB CO	.2891	.1506	.0299	.0151	.0218
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.8	14.5	33.8	45.8	41.8
LB. PER 1000 LB. OF FUEL	2.652	2.644	4.818	4.258	3.962
WEIGHT FLOW, LB./HR.	.371	.471	.972	1.133	1.078
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	4.4	7.2	9.9	6.2	4.4
LB. PER 1000 LB. OF FUEL	1.061	1.368	.678	.397	.417
WEIGHT FLOW, LB./HR.	.149	.243	.162	.106	.113
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.6	22.8	38.9	49.2	46.2
LB. PER 1000 LB. OF FUEL	3.713	4.012	4.687	4.655	4.379
WEIGHT FLOW, LB./HR.	.520	.714	1.134	1.238	1.191
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00698	.00697	.00697	.00697	.00697
SMOKE NUMBER	18.98	18.18	18.18	25.98	24.18
CORRECTED WEIGHT FLOW	.02896	.02891	.02891	.02890	.02890
SMOKE NUMBER	32.58	34.98	33.78	45.68	41.88
CORRECTED WEIGHT FLOW	.03492	.03483	.03483	.03482	.03482
SMOKE NUMBER	42.28	42.88	43.48	55.48	53.08
CORRECTED WEIGHT FLOW	.04880	.04876	.04873	.04871	.04875
SMOKE NUMBER	48.28	49.48	49.48	63.98	60.28
SMOKE NUMBER AT WA=0.023	34.78	36.88	36.68	48.38	45.28

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF HC, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-12-75 FUEL=AV. KERO. P BARO= 28.71

DATA POINT NUMBER	111	112	113	114	115
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.858	5.401	3.596	3.383	4.313
UNBURNED HYDROCARBONS	1.462	.813	.186	.859	.894
OXIDES OF NITROGEN	.529	.714	1.134	1.238	1.191
NITRIC OXIDE	.371	.471	.972	1.133	1.078
POWER LEVEL HP	0.00	76.15	189.98	234.98	291.34
TOTAL CORRECTED HORSEPOWER	0.00	79.19	197.76	245.83	262.28
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	70.946	18.971	14.863	17.168
UNBURNED HYDROCARBONS	0.000	10.683	.968	.213	.375
OXIDES OF NITROGEN	0.000	9.381	5.984	5.271	4.738
NITRIC OXIDE	0.000	6.183	5.129	4.621	4.287

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRRESEARCH TEST FACILITY: PWA LACCR INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-18-75
MODEL NO.: GTCP85-98CK S/N#: 36197 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 27 JULY 1973 **********
** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **

HYDROCARBONS (HC AS CH4)	.398	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.239	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.678	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0. HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 6 DATE: 6-13-75 TIME: 8.25 BARO. PRESS.: 28.748 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	116	117	118	119	120
POWER SETTING, CORRECTED HP.	0.00	78.71	197.44	0.00	43.99
N1 SPEED, RPM	41000.00	41078.00	41190.00	41020.00	40920.00
FUEL FLOW (MEAS.) LB./HR.	143.00	178.00	246.00	278.00	278.00
ENGINE CORE INLET AIRFLOW (CALC.) LB./SEC.	4.83	5.75	5.28	4.82	4.52
COMPRESSOR INLET TEMP., DEG. F	58.0	61.0	60.0	61.0	60.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.96	68.98	88.88	93.76	95.48
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	371.00	377.00	383.00	348.00	342.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.31	2.82
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	92.29	94.26
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	361.00	362.00
ENGINE EXHAUST GAS TEMP., DEG. F	479.0	991.0	841.0	1000.0	1000.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	120.980	76.980	9.990	9.780	11.480
CARBON MONOXIDE (CO), PPMV	244.179	264.644	199.181	217.990	262.971
TOTAL OXIDES OF NITROGEN (NOX), PPMV	14.988	21.880	37.208	46.008	46.600
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.830	1.765	2.741	3.402	3.596
NITRIC OXIDE (NO), PPMV	10.000	14.100	31.900	43.000	41.900
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.703	6.880	.411	.197	.361
CARBON MONOXIDE (CO)	35.626	29.539	14.479	12.486	15.647
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.479	3.996	6.461	6.317	6.239
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.469	.669	.101	.050	.100
CARBON MONOXIDE (CO)	5.095	5.257	3.560	3.372	4.350
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.497	.711	1.098	1.220	1.170
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.76	189.65	0.00	43.00
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	235.81	288.52
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.76	189.65	235.81	252.32
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.25	98.88	99.62	99.69	99.68
F/A (EMISSIONS)	.007	.009	.013	.017	.017

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36197 CGMS P/N= 998168-3 TEST DATE 6-13-79 FUEL=AV.KERO. P BARO= 28.76
BAT SHP= 289. BA EGT,F= 1198. BAT SPD= 41088. DE= PT,F= 97. REL HUM= 99.00 SPEC HUM= .010000
FUEL H/C= 1.9288 STDI F/A= .06922 L H V= 18478. S .N T,F= 388.8 FLO.L/HR= 14.168 SL TIM,S= 0.5000

DATA POINT NUMBER	116	117	118	119	120
PERCENT MAX. CORRECTED POWER	0.0	39.4	98.7	0.0	22.8
CORRECTED SHAFT HP	0.0	78.7	197.5	0.0	45.6
MEASURED SHAFT HP	0.0	75.8	189.9	0.0	43.8
EXHAUST GAS TEMP., DEG.F	473.0	991.0	1941.0	1000.0	1000.0
SHAFT SPEED, N1, RPM	41000.0	41470.0	41190.0	41020.0	40928.0
COMPRESSOR DSCHG. PRES.,PSIA	62.0	61.8	60.0	53.8	55.5
COMPRESSOR DSCHG. TEMP.,DEG F	371.0	377.0	383.0	340.0	342.0
EXHAUST GAS PRESS., PSIA	13.68	13.79	13.87	13.86	13.85
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.484	2.118
COMPRESSOR MAP FLOW,LB/SEC	6.18	5.72	5.28	6.74	6.62
FA RATIO BASED ON MAP FLOW	.0065	.0086	.0131	.0169	.0166
CORRECTED FUEL FLOW , LB/HR	143.0	178.0	246.0	278.0	278.0
FA RATIO CALC. FROM EMISSION	.0066	.0086	.0131	.0166	.0172
EQUIVALENCE RATIO	.097	.126	.193	.243	.252
LOADING W/P**N/V/E(T/540)	.354	.366	.339	.379	.378
COMB EFFIC FROM EMISSIONS	98.291	98.877	99.624	99.698	99.688

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.34	1.76	2.74	3.48	3.48
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	438.9	550.8	770.8	846.2	849.7
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.2	264.6	199.1	218.8	282.6
LB. PER 1000 LB. OF FUEL	35.626	29.535	14.479	12.488	15.647
WEIGHT FLOW, LB./HR.	5.095	5.257	3.568	3.372	4.350
UNBURNED HYDROCARBONS--PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	124.5	76.5	9.9	9.7	11.4
LB. PER 1000 LB. OF FUEL	18.363	4.688	.411	.387	.361
WEIGHT FLOW, LB./HR.	1.485	.869	.181	.358	.188
RATIO LB HC/LB CO	.2914	.1652	.0284	.0149	.0231
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.0	14.1	31.9	43.8	41.9
LB. PER 1000 LB. OF FUEL	2.397	2.565	3.886	4.846	3.811
WEIGHT FLOW, LB./HR.	.343	.468	.937	1.092	1.059
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	4.8	7.7	9.3	9.8	4.7
LB. PER 1000 LB. OF FUEL	1.079	1.412	.633	.478	.427
WEIGHT FLOW, LB./HR.	.154	.251	.156	.127	.119
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	14.9	21.8	37.2	48.8	46.6
LB. PER 1000 LB. OF FUEL	3.475	3.976	4.441	4.517	4.239
WEIGHT FLOW, LB./HR.	.497	.711	1.093	1.220	1.178
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00701	.00703	.00701	.00702	.00701
SMOKE NUMBER	16.90	19.30	15.70	26.50	22.90
CORRECTED WEIGHT FLOW	.02184	.02184	.02183	.02185	.02182
SMOKE NUMBER	32.50	37.30	31.30	45.80	43.40
CORRECTED WEIGHT FLOW	.03507	.03511	.03509	.03499	.03501
SMOKE NUMBER	42.20	46.60	42.20	55.40	53.80
CORRECTED WEIGHT FLOW	.04907	.04916	.04912	.04897	.04899
SMOKE NUMBER	48.20	51.80	48.20	61.40	60.20
SMOKE NUMBER AT WA=0.023	35.30	34.60	34.70	47.70	45.40

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36197 COMB P/N= 698168-3 TEST DATE 6-13-79 FUEL=AV.KERO. P BARO= 28.74

DATA POINT NUMBER	116	117	118	119	120
EMISSION RATE LB/HR					
CARBON MONOXIDE	9.893	9.297	3.568	3.372	4.358
UNBURNED HYDROCARBONS	1.485	.869	.181	.858	.188
OXIDES OF NITROGEN	.497	.711	1.893	1.228	1.178
NITRIC OXIDE	.343	.460	.937	1.892	1.059
POWER LEVEL HP	0.00	75.76	189.85	235.81	252.32
TOTAL CORRECTED HORSEPOWER	0.00	78.71	197.46	245.97	262.85
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	69.397	18.758	14.299	17.239
UNBURNED HYDROCARBONS	0.000	11.466	.533	.214	.398
OXIDES OF NITROGEN	0.000	9.398	9.754	9.172	4.678
NITRIC OXIDE	0.000	6.078	4.985	4.633	4.199

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG. V38 N136 CALC. DATE: 6-5-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 288. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4) .298 LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO) 12.991 LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2) 5.288 LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 9 DATE: 6-5-75 TIME: 7.00 BARO. PRESS.: 28.610 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 32.00 PERCENT SPECIFIC HUMIDITY: .018000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	121	122	123	124	125
POWER SETTING, CORRECTED HP.	0.00	79.52	195.55	0.00	45.19
N1 SPEED, RPM	41748.00	41618.00	41296.00	41110.00	41060.00
FUEL FLOW (MEAS.) LB./HR.	148.00	169.00	244.00	278.00	276.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.02	5.58	5.20	6.42	6.37
COMPRESSOR INLET TEMP., DEG. F	91.0	91.0	91.0	92.0	91.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.39	58.72	59.90	58.82	52.39
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	397.00	431.00	488.00	369.00	367.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.24	1.95
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.44	52.14
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	389.00	398.00
ENGINE EXHAUST GAS TEMP., DEG. F	481.0	659.0	829.0	1063.0	1023.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	123.000	69.000	18.000	4.500	8.400
CARBON MONOXIDE (CO), PPMV	232.442	254.593	262.119	189.798	288.502
TOTAL OXIDES OF NITROGEN (NOX), PPMV	14.000	21.000	36.500	54.500	51.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.314	1.729	2.671	3.771	3.641
NITRIC OXIDE (NO), PPMV	9.300	12.000	29.500	50.000	46.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	18.455	4.494	.765	.136	.263
CARBON MONOXIDE (CO)	34.566	29.010	19.494	18.851	11.428
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.420	3.931	4.459	4.761	4.592
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.464	.759	.187	.037	.073
CARBON MONOXIDE (CO)	4.839	4.903	4.756	2.714	3.154
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.479	.664	1.088	1.288	1.267
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.74	195.63	0.00	44.52
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	226.42	199.02
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.74	195.63	226.42	243.55
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.27	98.92	99.47	99.79	99.71
F/A (EMISSIONS)	.006	.008	.013	.010	.017

**** AIRESEARCH EMISSION TEST SUMMARY ****

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=4981168-3 TEST DATE 6-5-75 FUEL=AV. KERO. P BARO= 28.61
RAT SHP= 200. RA EGT.F= 1150. RAT SPD= 41000. GEN PF.F= 57. REL HUM= 32.00 SPEC HUM= .010000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T.F= 355.8 FLO.L/M= 14.160 SL TIM.S= 6.5000

DATA POINT NUMBER	121	122	123	124	125
PERCENT MAX. CORRECTED POWER	0.0	40.0	99.3	0.0	22.6
CORRECTED SHAFT HP	0.0	79.9	198.6	0.0	45.2
MEASURED SHAFT HP	0.0	78.7	195.6	0.0	44.5
EXHAUST GAS TEMP., DEG.F	401.0	659.0	829.0	1063.0	1023.0
SHAFT SPEED, N1, RPM	=1760.0	=1610.0	=1250.0	=1110.0	=1060.0
COMPRESSOR DSCHG. PRES.,PSIA	60.4	58.7	59.9	53.8	52.4
COMPRESSOR DSCHG. TEMP.,DEG F	397.0	431.0	488.0	369.0	367.0
EXHAUST GAS PRESS., PSIA	13.63	13.69	13.78	13.76	13.77
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.411	2.183
COMPRESSOR MAP FLOW,LB/SEC	6.07	5.52	5.26	6.62	6.57
FA RATIO BASED ON MAP FLOW	.0064	.0065	.0128	.0171	.0166
CORRECTED FUEL FLOW , LB/HR	148.0	169.0	244.0	270.0	276.0
FA RATIO CALC. FROM EMISSION	.0069	.0064	.0128	.0179	.0173
EQUIVALENCE RATIO	.095	.123	.188	.263	.254
LOADING W/P**N/V/E(T/948)	.391	.342	.338	.392	.393
COMB EFFIC FROM EMISSIONS	98.278	98.923	99.474	99.792	99.788

**** SUMMARY OF REDUCED EMISSION DATA ****

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.81	1.78	2.67	3.77	3.64
LB. CO2 PER LB. OF FUEL	3.07	3.10	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	429.9	523.2	761.6	847.2	865.4
CARBON MONOXIDE					
PPM BY VOLUME, WET	282.4	254.6	262.1	189.8	208.5
LB. PER 1000 LB. OF FUEL	34.966	29.018	19.494	10.051	11.428
WEIGHT FLOW, LB./HR.	4.839	4.903	4.756	2.714	3.194
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	123.0	69.0	18.0	4.5	8.4
LB. PER 1000 LB. OF FUEL	10.495	4.494	.766	.136	.263
WEIGHT FLOW, LB./HR.	1.464	.759	.187	.037	.073
RATIO LB HC/LB CO	.3025	.1549	.0393	.0136	.0230
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.3	12.8	29.5	58.8	46.5
LB. PER 1000 LB. OF FUEL	1.295	2.246	3.604	4.349	4.186
WEIGHT FLOW, LB./HR.	.181	.380	.879	1.174	1.155
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	8.7	9.8	7.8	4.9	4.9
LB. PER 1000 LB. OF FUEL	2.125	1.685	.855	.391	.485
WEIGHT FLOW, LB./HR.	.298	.285	.289	.106	.112
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	14.8	21.8	36.9	94.9	51.8
LB. PER 1000 LB. OF FUEL	3.420	3.931	4.459	4.741	4.592
WEIGHT FLOW, LB./HR.	.479	.664	1.088	1.280	1.267
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08786	.08784	.08785	.08785	.08784
SMOKE NUMBER	11.98	17.18	18.38	28.78	18.98
CORRECTED WEIGHT FLOW	.02117	.02112	.02116	.02115	.02112
SMOKE NUMBER	26.88	32.98	32.38	39.88	28.78
CORRECTED WEIGHT FLOW	.03529	.03528	.03527	.03525	.03519
SMOKE NUMBER	34.88	41.58	44.58	49.48	45.78
CORRECTED WEIGHT FLOW	.04949	.04928	.04937	.04935	.04936
SMOKE NUMBER	41.88	47.68	47.68	56.18	55.58
SMOKE NUMBER AT MA=0.823	28.88	35.18	36.88	41.78	37.68

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-5-75 FUEL=AV. KERO. P BARO= 28.61

DATA POINT NUMBER.	121	122	123	124	125
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.839	4.983	4.756	2.714	3.154
UNBURNED HYDROCARBONS	1.484	.759	.187	.037	.073
OXIDES OF NITROGEN	.479	.664	1.088	1.280	1.267
NITRIC OXIDE	.181	.368	.879	1.174	1.155
POWER LEVEL HP	0.00	78.74	195.63	226.42	243.55
TOTAL CORRECTED HORSEPOWER	0.00	79.92	198.55	244.28	259.65
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	62.269	24.314	11.985	12.951
UNBURNED HYDROCARBONS	0.000	9.646	.954	.162	.298
OXIDES OF NITROGEN	0.000	8.436	5.561	5.653	5.203
NITRIC OXIDE	0.000	4.821	4.495	5.187	4.744

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG. V38 N136 CALC. DATE: 6-5-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.195	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	12.987	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.098	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 9 DATE: 6-5-75 TIME: 08.50 BARO. PRESS.: 28.610 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 32.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	126	127	128	129	130
POWER SETTING, CORRECTED HP.	0.00	79.58	198.49	0.00	45.81
N1 SPEED, RPM	41720.00	41550.00	41280.00	41050.00	41020.00
FUEL FLOW (MEAS.) LB./HR.	137.00	174.00	242.00	278.00	274.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.72	5.81	5.34	6.51	6.47
COMPRESSOR INLET TEMP., DEG. F	93.0	93.0	93.0	92.0	92.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.15	58.64	59.66	50.82	53.27
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	400.00	401.00	400.00	362.00	365.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.25	1.97
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.35	51.95
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	389.00	389.00
ENGINE EXHAUST GAS TEMP., DEG. F	475.0	585.0	838.0	1062.0	1026.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	117.000	79.000	15.000	4.500	5.400
CARBON MONOXIDE (CO), PPMV	227.600	254.593	249.616	187.476	203.798
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	22.000	38.000	54.000	49.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.355	1.707	2.618	3.706	3.545
NITRIC OXIDE (NO), PPMV	11.000	13.000	31.000	49.000	45.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.659	4.945	.651	.139	.174
CARBON MONOXIDE (CO)	32.873	29.366	18.948	10.183	11.473
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.559	4.168	4.738	4.788	4.531
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.323	.860	.157	.037	.048
CARBON MONOXIDE (CO)	4.504	5.110	4.585	2.728	3.143
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.488	.725	1.147	1.291	1.242
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.33	195.39	0.00	44.38
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	228.04	199.16
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.33	195.39	228.04	243.54
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.38	98.88	99.50	99.75	99.71
F/A (EMISSIONS)	.007	.006	.013	.018	.017

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-5-75 FUEL=AV. KERO. P BARO= 28.61
RAT SHP= 238. RA EGT,F= 1158. RAT SPD= 41688. DEW PT,F= 57. REL HUM= 32.00 SPEC HUM= .018008
FUEL H/C= 1.9289 STOI F/A= .06822 L H V= 18478. S LN T,F= 388.8 FLO,L/H= 14.160 SL TIN,S= 6.5898

DATA POINT NUMBER	126	127	128	129	130
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.2	0.0	22.5
CORRECTED SHAFT HP	0.0	79.6	198.5	0.0	45.0
MEASURED SHAFT HP	0.0	78.3	195.4	0.0	44.4
EXHAUST GAS TEMP., DEG.F	475.0	585.0	830.0	1062.0	1026.0
SHAFT SPEED, N1, RPM	41720.0	41550.0	41200.0	41050.0	41020.0
COMPRESSOR DSCHG. PRES.,PSIA	60.1	60.6	59.7	58.8	58.3
COMPRESSOR DSCHG. TEMP,DEG F	489.0	401.0	486.0	362.0	365.0
EXHAUST GAS PRESS., PSIA	13.63	13.66	13.78	13.77	13.77
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.428	2.121
COMPRESSOR MAP FLOW,LB/SEC	6.07	5.94	5.58	6.63	6.49
FA RATIO BASED ON MAP FLOW	.0063	.0087	.0122	.0171	.0168
CORRECTED FUEL FLOW , LB/HR	137.8	174.8	242.8	270.8	274.8
FA RATIO CALC. FROM EMISSION	.0067	.0083	.0126	.0176	.0169
EQUIVALENCE RATIO	.098	.122	.184	.258	.248
LOADING W/P**N/V/E(T/540)	.381	.342	.345	.396	.375
COMB EFFIC FROM EMISSIONS	98.379	98.875	99.497	99.758	99.715

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.36	1.71	2.62	3.71	3.54
LB. CO2 PER LB. OF FUEL	3.08	3.09	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	421.4	538.4	755.6	847.2	859.1
CARBON MONOXIDE					
PPM BY VOLUME, WET	227.6	254.6	249.6	187.5	283.8
LB. PER 1000 LB. OF FUEL	32.873	29.366	18.948	10.183	11.473
WEIGHT FLOW, LB./HR.	4.534	5.110	4.585	2.728	3.143
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	117.0	75.0	15.0	4.5	5.4
LB. PER 1000 LB. OF FUEL	9.699	4.945	.651	.139	.174
WEIGHT FLOW, LB./HR.	1.323	.860	.157	.037	.048
RATIO LB HC/LB CO	.2938	.1684	.0343	.0137	.0151
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.8	13.8	31.8	49.8	49.5
LB. PER 1000 LB. OF FUEL	2.618	2.463	3.965	4.489	4.288
WEIGHT FLOW, LB./HR.	.358	.429	.960	1.198	1.153
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	4.8	9.8	6.2	4.2	3.5
LB. PER 1000 LB. OF FUEL	.949	1.785	.773	.372	.324
WEIGHT FLOW, LB./HR.	.130	.297	.187	.100	.089
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.8	22.8	38.8	54.8	49.8
LB. PER 1000 LB. OF FUEL	3.559	4.168	4.738	4.788	4.531
WEIGHT FLOW, LB./HR.	.488	.725	1.147	1.291	1.242
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08784	.08781	.08788	.08782	.08784
SMOKE NUMBER	15.98	28.18	19.98	23.28	21.38
CORRECTED WEIGHT FLOW	.02112	.02102	.02188	.02187	.02111
SMOKE NUMBER	28.08	35.48	32.98	37.88	36.68
CORRECTED WEIGHT FLOW	.03528	.03583	.03588	.03512	.03516
SMOKE NUMBER	39.88	43.38	41.58	47.88	47.68
CORRECTED WEIGHT FLOW	.04919	.04984	.04988	.04917	.04926
SMOKE NUMBER	43.98	58.88	58.88	57.38	53.78
SMOKE NUMBER AT MA=0.028	32.88	37.68	35.58	41.78	48.18

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01),
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

•• AIRESEARCH EMISSION TEST SUMMARY ••

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-5-75 FUEL=AV. KERO. P BARO= 28.61

DATA POINT NUMBER		126	127	128	129	130
EMISSION RATE LB/HR						
	CARBON MONOXIDE	4.594	5.110	4.585	2.728	3.143
	UNBURNED HYDROCARBONS	1.323	.868	.157	.037	.048
	OXIDES OF NITROGEN	.488	.725	1.167	1.291	1.242
	NITRIC OXIDE	.358	.429	.968	1.198	1.153
POWER LEVEL HP		0.00	78.33	195.39	228.84	243.54
TOTAL CORRECTED HORSEPOWER		0.00	79.58	198.49	245.95	259.81
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR						
	CARBON MONOXIDE	0.000	65.229	23.467	11.963	12.987
	UNBURNED HYDROCARBONS	0.000	10.983	.806	.164	.195
	OXIDES OF NITROGEN	0.000	9.259	5.868	5.660	5.098
	NITRIC OXIDE	0.000	5.471	4.911	5.220	4.734

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG. V38 N136 CALC. DATE: 6-5-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.159	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	13.086	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	5.116	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 9 DATE: 6-5-75 TIME: 18.25 BARO. PRESS.: 28.618 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 32.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	131	132	133	134	135
POWER SETTING, CORRECTED HP.	0.00	79.57	197.89	0.00	45.33
N1 SPEED, RPM	41690.00	41520.00	41190.00	41040.00	41010.00
FUEL FLOW (MEAS.) LB./HR.	136.00	168.00	242.00	278.00	274.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.97	5.61	5.21	6.45	6.41
COMPRESSOR INLET TEMP., DEG. F	92.0	92.0	92.0	91.0	91.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.15	60.29	59.51	50.82	53.42
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	488.00	483.00	486.00	361.00	364.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.27	1.98
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.35	49.35
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	389.00	389.00
ENGINE EXHAUST GAS TEMP., DEG. F	477.0	587.0	826.0	1063.0	1028.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	114.000	72.000	15.000	3.300	4.500
CARBON MONOXIDE (CO), PPMV	238.017	259.602	259.602	195.832	210.867
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	22.000	38.500	55.500	50.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.286	1.787	2.667	3.771	3.609
NITRIC OXIDE (NO), PPMV	11.500	13.000	32.000	50.500	46.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.908	4.746	.634	.108	.142
CARBON MONOXIDE (CO)	34.975	29.940	19.196	10.369	11.660
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.747	4.168	4.676	4.827	4.587
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.347	.797	.153	.027	.039
CARBON MONOXIDE (CO)	4.757	5.030	4.646	2.888	3.195
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.510	.700	1.132	1.303	1.257
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.47	195.15	0.00	44.66
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	230.29	200.99
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.47	195.15	230.29	245.65
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.31	98.88	99.49	99.75	99.71
F/A (EMISSIONS)	.006	.008	.013	.018	.017

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-5-75 FUEL=AV. KERO. P BARO= 28.61
RAT SHP= 288. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 57. REL HUM= 32.88 SPEC HUM= .010088
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.168 SL TIM,S= 6.5088

DATA POINT NUMBER	131	132	133	134	135
PERCENT MAX. CORRECTED POWER	0.0	39.6	98.9	0.0	22.7
CORRECTED SHAFT HP	0.0	79.6	197.9	0.0	45.3
MEASURED SHAFT HP	0.0	78.5	195.2	0.0	44.7
EXHAUST GAS TEMP., DEG.F	477.0	587.0	826.0	1063.0	1020.0
SHAFT SPEED, N1, RPM	41698.0	41520.0	41190.0	41040.0	41010.0
COMPRESSOR DSCHG. PRES.,PSIA	68.1	60.3	59.5	50.0	53.4
COMPRESSOR DSCHG. TEMP,DEG F	408.0	403.0	408.0	361.0	364.0
EXHAUST GAS PRESS., PSIA	13.64	13.66	13.77	13.77	13.77
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.442	2.131
COMPRESSOR MAP FLOW,LB/SEC	6.84	5.77	5.26	6.59	6.37
FA RATIO BASED ON MAP FLOW	.0062	.0081	.0127	.0173	.0173
CORRECTED FUEL FLOW , LB/HR	136.0	168.0	242.0	270.0	274.0
FA RATIO CALC. FROM EMISSION	.0063	.0083	.0129	.0179	.0172
EQUIVALENCE RATIO	.093	.122	.189	.263	.252
LOADING W/P**N/V/E(T/540)	.380	.359	.333	.393	.363
COMB EFFIC FROM EMISSIONS	98.388	98.879	99.493	99.747	99.713

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.29	1.71	2.69	3.77	3.61
LB. CO2 PER LB. OF FUEL	3.87	3.09	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	417.8	519.8	755.6	847.1	859.1
CARBON MONOXIDE					
PPM BY VOLUME, WET	238.8	259.6	259.6	195.8	218.9
LB. PER 1000 LB. OF FUEL	34.975	29.948	19.196	10.369	11.668
WEIGHT FLOW, LB./HR.	4.757	5.030	4.646	2.800	3.195
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	114.8	72.8	15.8	3.3	4.5
LB. PER 1000 LB. OF FUEL	9.988	4.746	.634	.180	.142
WEIGHT FLOW, LB./HR.	1.347	.797	.153	.027	.039
RATIO LB HC/LB CO	.2833	.1585	.0330	.0096	.0122
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.5	13.8	32.8	58.5	46.8
LB. PER 1000 LB. OF FUEL	2.872	2.463	3.887	4.392	4.178
WEIGHT FLOW, LB./HR.	.391	.414	.941	1.186	1.145
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.5	9.8	6.5	5.8	4.5
LB. PER 1000 LB. OF FUEL	.874	1.705	.790	.435	.409
WEIGHT FLOW, LB./HR.	.119	.286	.191	.117	.112
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.8	22.8	38.5	55.5	50.5
LB. PER 1000 LB. OF FUEL	3.747	4.168	4.676	4.827	4.587
WEIGHT FLOW, LB./HR.	.510	.700	1.132	1.303	1.257
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00704	.00701	.00703	.00703	.00703
SMOKE NUMBER	10.40	13.40	14.60	20.70	20.70
CORRECTED WEIGHT FLOW	.02112	.02104	.02108	.02108	.02108
SMOKE NUMBER	22.00	31.10	30.50	37.60	37.60
CORRECTED WEIGHT FLOW	.03520	.03507	.03513	.03513	.03513
SMOKE NUMBER	30.50	37.80	38.40	47.60	47.60
CORRECTED WEIGHT FLOW	.04928	.04910	.04918	.04918	.04918
SMOKE NUMBER	34.80	47.00	47.60	56.10	56.10
SMOKE NUMBER AT WA=0.023	24.60	32.70	33.10	38.20	38.20

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-9-75 FUEL=AV. KERO. P BARO= 28.61

DATA POINT NUMBER	131	132	133	134	135
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.757	5.038	4.646	2.888	3.195
UNBURNED HYDROCARBONS	1.347	.797	.153	.027	.039
OXIDES OF NITROGEN	.518	.788	1.132	1.383	1.257
NITRIC OXIDE	.391	.414	.941	1.186	1.145
POWER LEVEL HP	0.00	78.47	195.15	238.29	245.65
TOTAL CORRECTED HORSEPOWER	0.00	79.57	197.89	240.16	261.91
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	64.099	23.805	12.157	13.006
UNBURNED HYDROCARBONS	0.000	10.161	.786	.117	.159
OXIDES OF NITROGEN	0.000	8.923	5.799	5.659	5.116
NITRIC OXIDE	0.000	5.273	4.820	5.150	4.660

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-6-75

MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1

FUEL: ASTM D1655-73 MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT

ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********

********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.296	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.930	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.878	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE

ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 8.8 HR.

ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 10 DATE: 6-6-75 TIME: 05:25 BARO. PRESS.: 28.680 IN. HGA.

AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT SPECIFIC HUMIDITY: .015000 LB. H2O/LB. DRY AIR

AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV

SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	136	137	138	139	140
POWER SETTING, CORRECTED HP.	0.00	79.63	198.02	0.00	45.79
N1 SPEED, RPM	41730.00	41560.00	41240.00	41120.00	41090.00
FUEL FLOW (MEAS.) LB./HR.	146.00	185.00	254.00	280.00	280.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.27	6.16	5.66	6.67	6.61
COMPRESSOR INLET TEMP., DEG. F	92.0	91.0	91.0	91.0	91.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.87	62.60	62.60	52.05	54.70
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	375.00	379.00	385.00	350.00	342.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.26	1.97
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	50.82	53.67
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	375.00	366.00
ENGINE EXHAUST GAS TEMP., DEG. F	478.0	570.0	780.0	1014.0	977.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	132.000	109.500	19.500	3.600	7.500
CARBON MONOXIDE (CO), PPMV	237.311	257.093	277.464	217.999	259.602
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.500	19.000	33.000	47.800	43.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.314	1.787	2.592	3.786	3.513
NITRIC OXIDE (NO), PPMV	5.500	10.500	26.500	43.800	38.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	11.208	7.204	.854	.111	.243
CARBON MONOXIDE (CO)	35.254	29.592	21.242	11.739	14.721
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.294	3.592	4.151	4.226	4.885
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.636	1.333	.217	.931	.868
CARBON MONOXIDE (CO)	5.147	5.474	5.396	3.287	4.122
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.461	.665	1.054	1.184	1.122
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.65	195.56	0.00	45.23
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	219.07	184.67
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.65	195.56	219.07	229.90
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.19	98.67	99.43	99.71	99.63
F/A (EMISSIONS)	.006	.008	.012	.016	.017

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-6-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41730. DEW PT,F= 68.
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0

FUEL=AV. KERO. P BARO= 28.68
REL HUM= 48.00 SPEC HUM= .015000
FLO.L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	136	137	138	139	140
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.0	0.0	22.9
CORRECTED SHAFT HP	0.0	79.6	198.0	0.0	45.8
MEASURED SHAFT HP	0.0	78.6	195.6	0.0	45.2
EXHAUST GAS TEMP., DEG.F	470.0	578.0	780.0	1014.0	977.8
SHAFT SPEED, N1, RPM	41730.0	41560.0	41240.0	41128.0	41090.0
COMPRESSOR DSCHG. PRES.,PSIA	61.9	62.6	62.6	52.0	54.7
COMPRESSOR DSCHG. TEMP,DEG F	375.0	379.0	385.0	350.0	342.0
EXHAUST GAS PRESS., PSIA	13.65	13.69	13.81	13.79	13.88
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.432	2.117
COMPRESSOR MAP FLOW,LB/SEC	6.19	6.22	5.52	6.67	6.57
FA RATIO BASED ON MAP FLOW	.0066	.0083	.0128	.0177	.0169
CORRECTED FUEL FLOW , LB/HR	146.0	185.0	254.0	280.0	280.0
FA RATIO CALC. FROM EMISSION	.0065	.0083	.0125	.0176	.0168
EQUIVALENCE RATIO	.035	.122	.163	.259	.246
LOADING W/P**N/V/E(T/540)	.388	.379	.332	.391	.380
COMB EFFIC FROM EMISSIONS	98.188	98.672	99.425	99.714	99.632

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.71	2.59	3.71	3.51
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.12	3.14	3.13
WEIGHT FLOW, LB./HR.	447.9	571.2	792.1	877.9	876.5
CARBON MONOXIDE					
PPM BY VOLUME, WET	237.3	257.1	277.4	218.0	259.6
LB. PER 1000 LB. OF FUEL	35.254	29.592	21.242	11.739	14.721
WEIGHT FLOW, LB./HR.	5.147	5.474	5.396	3.287	4.122
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	132.0	189.5	19.5	3.6	7.5
LB. PER 1000 LB. OF FUEL	11.208	7.204	.854	.111	.243
WEIGHT FLOW, LB./HR.	1.636	1.333	.217	.031	.068
RATIO LB HC/LB CO	.3179	.2434	.0402	.0094	.0165
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	5.5	10.5	26.5	43.0	38.0
LB. PER 1000 LB. OF FUEL	1.342	1.985	3.333	3.804	3.540
WEIGHT FLOW, LB./HR.	.196	.367	.847	1.065	.991
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	8.0	8.5	6.5	4.8	5.0
LB. PER 1000 LB. OF FUEL	1.952	1.607	.818	.425	.466
WEIGHT FLOW, LB./HR.	.285	.297	.208	.119	.130
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.5	19.0	33.0	47.8	43.8
LB. PER 1000 LB. OF FUEL	3.294	3.592	4.151	4.228	4.085
WEIGHT FLOW, LB./HR.	.481	.665	1.054	1.184	1.122
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00716	.00715	.00715	.00713	.00713
SMOKE NUMBER	14.50	14.50	18.10	21.70	18.10
CORPECTED WEIGHT FLOW	.02149	.02145	.02144	.02139	.02140
SMOKE NUMBER	28.90	31.30	33.70	41.00	34.30
CORRECTED WEIGHT FLOW	.03582	.03575	.03573	.03565	.03566
SMOKE NUMBER	38.00	39.80	43.40	51.20	45.80
CORRECTED WEIGHT FLOW	.05014	.05005	.05002	.04990	.04993
SMOKE NUMBER	46.40	47.00	50.60	56.60	53.00
SMOKE NUMBER AT HA=0.023	32.00	33.20	36.50	42.80	37.90

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-6-75 FUEL=AV. KERO. P BARO= 28.68

DATA POINT NUMBER	136	137	138	139	140
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.147	5.474	5.396	3.287	4.122
UNBURNED HYDROCARBONS	1.636	1.333	.217	.031	.868
OXIDES OF NITROGEN	.481	.665	1.054	1.184	1.122
NITRIC OXIDE	.196	.367	.847	1.065	.991
POWER LEVEL HP	0.00	78.65	195.58	219.07	229.98
TOTAL CORRECTED HORSEPOWER	0.00	79.63	198.02	235.48	244.30
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	69.609	27.587	15.004	17.930
UNBURNED HYDROCARBONS	0.000	16.946	1.108	.142	.296
OXIDES OF NITROGEN	0.000	8.458	5.391	5.404	4.878
NITRIC OXIDE	0.000	4.670	4.329	4.861	4.311

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-6-75
MODEL NO.: GTCP85-98CK S/N: 36173 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.248	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.717	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.981	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 893168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 10 DATE: 6-6-75 TIME: 06:48 BARO. PRESS.: 28.680 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT SPECIFIC HUMIDITY: .015000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.58 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	141	142	143	144	145
POWER SETTING, CORRECTED HP.	0.00	79.61	198.25	0.00	45.68
N1 SPEED, RPM	41730.00	41550.00	41250.00	41090.00	41080.00
FUEL FLOW (MEAS.) LB./HR.	146.00	184.00	250.00	280.00	280.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.21	6.14	5.57	6.65	6.61
COMPRESSOR INLET TEMP., DEG. F	91.0	91.0	90.0	90.0	91.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	62.01	62.70	62.11	52.29	54.75
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	370.00	377.00	387.00	338.00	347.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.28	1.97
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	50.02	53.76
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	367.00	367.00
ENGINE EXHAUST GAS TEMP., DEG. F	458.0	563.0	782.0	1021.0	978.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	129.000	84.000	21.000	3.600	6.300
CARBON MONOXIDE (CO), PPMV	239.757	257.093	274.834	217.999	257.093
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.500	19.000	32.200	48.500	44.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.327	1.707	2.592	3.738	3.513
NITRIC OXIDE (NO), PPMV	10.500	11.000	25.800	45.000	38.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.855	5.534	.919	.118	.204
CARBON MONOXIDE (CO)	35.298	29.635	21.046	11.637	14.580
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.265	3.598	4.858	4.253	4.099
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.585	1.018	.230	.031	.057
CARBON MONOXIDE (CO)	5.154	5.453	5.262	3.258	4.083
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.477	.662	1.013	1.191	1.148
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.63	195.63	0.00	45.12
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	215.06	185.30
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.63	195.63	215.06	230.42
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.22	98.82	99.42	99.72	99.64
F/A (EMISSIONS)	.007	.008	.012	.018	.017

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-6-75 FUEL=AV. KERO. P BARO= 28.68
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41730. DEW PT,F= 68. REL HUM= 46.00 SPEC HUM= .015000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	141	142	143	144	145
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.1	0.0	22.8
CORRECTED SHAFT HP	0.0	79.6	198.2	0.0	45.7
MEASURED SHAFT HP	0.0	78.6	195.6	0.0	45.1
EXHAUST GAS TEMP., DEG.F	458.0	563.0	782.0	1021.0	976.0
SHAFT SPEED, N1, RPM	41730.0	41550.0	41250.0	41090.0	41080.0
COMPRESSOR DSCHG. PRES.,PSIA	62.0	62.7	62.1	52.3	54.7
COMPRESSOR DSCHG. TEMP,DEG F	370.0	377.0	387.0	338.0	347.0
EXHAUST GAS PRESS., PSIA	13.55	13.69	13.82	13.79	13.79
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.445	2.116
COMPRESSOR MAP FLOW,LB/SEC	6.27	6.02	5.47	6.62	6.53
FA RATIO BASED ON MAP FLOW	.0065	.0085	.0127	.0179	.0178
CORRECTED FUEL FLOW , LB/HR	146.0	184.0	250.0	280.0	280.0
FA RATIO CALC. FROM EMISSION	.0065	.0083	.0125	.0178	.0168
EQUIVALENCE RATIO	.036	.122	.183	.261	.246
LOADING W/P**N/V/EXT/540)	.335	.367	.333	.391	.373
COMB EFFIC FROM EMISSIONS	98.217	98.817	99.424	99.717	99.639

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.33	1.71	2.59	3.74	3.51
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.12	3.14	3.13
WEIGHT FLOW, LB./HR.	448.0	569.0	779.6	877.9	876.6
CARBON MONOXIDE					
PPM BY VOLUME, WET	239.8	257.1	274.8	218.0	257.1
LB. PER 1000 LB. OF FUEL	35.293	29.635	21.046	11.637	14.588
WEIGHT FLOW, LB./HR.	5.154	5.453	5.262	3.258	4.083
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	129.0	84.0	21.0	3.6	6.3
LB. PER 1000 LB. OF FUEL	10.855	5.534	.919	.118	.204
WEIGHT FLOW, LB./HR.	1.585	1.018	.230	.031	.057
RATIO LB HC/LB CO	.3075	.1868	.0437	.0094	.0140
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.5	11.0	25.8	45.8	36.5
LB. PER 1000 LB. OF FUEL	2.539	2.083	3.245	3.946	3.587
WEIGHT FLOW, LB./HR.	.371	.383	.811	1.105	1.004
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.0	8.0	6.4	3.5	5.5
LB. PER 1000 LB. OF FUEL	.726	1.515	.805	.387	.512
WEIGHT FLOW, LB./HR.	.106	.279	.201	.086	.143
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.5	19.0	32.2	48.5	44.8
LB. PER 1000 LB. OF FUEL	3.265	3.598	4.050	4.253	4.099
WEIGHT FLOW, LB./HR.	.477	.662	1.013	1.191	1.148
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00712	.00711	.00709	.00709	.00708
SMOKE NUMBER	15.10	15.10	18.10	21.70	18.10
CORRECTED WEIGHT FLOW	.02137	.02133	.02127	.02127	.02124
SMOKE NUMBER	30.10	30.70	34.90	39.80	34.90
CORRECTED WEIGHT FLOW	.03562	.03555	.03545	.03545	.03540
SMOKE NUMBER	40.40	42.20	44.60	52.40	44.60
CORRECTED WEIGHT FLOW	.04936	.04977	.04963	.04963	.04956
SMOKE NUMBER	44.60	48.80	53.60	59.60	53.00
SMOKE NUMBER AT WA=0.023	32.70	34.40	38.80	43.60	37.90

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-6-75 FUEL=AV. KERO. P BARO= 28.68

DATA POINT NUMBER	141	142	143	144	145
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.154	5.453	5.262	3.256	4.083
UNBURNED HYDROCARBONS	1.535	1.018	.230	.031	.057
OXIDES OF NITROGEN	.477	.662	1.013	1.191	1.148
NITRIC OXIDE	.371	.383	.811	1.105	1.084
POWER LEVEL HP	0.00	78.63	195.63	215.86	238.42
TOTAL CORRECTED HORSEPOWER	0.00	79.61	198.25	230.97	244.87
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	69.351	26.896	15.151	17.717
UNBURNED HYDROCARBONS	0.000	12.952	1.175	.143	.248
OXIDES OF NITROGEN	0.000	8.419	5.176	5.537	4.981
NITRIC OXIDE	0.000	4.874	4.147	5.137	4.358

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-6-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE
FUEL: ASTM D1655-73

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.249	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	17.942	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.791	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION: USER:
MODEL NO.:
AIRCRAFT INSTALLATION *** MFR.:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 10 DATE: 6-6-75 TIME: 07:55 BARO. PRESS.: 28.680 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT SPECIFIC HUMIDITY: .015000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	146	147	148	149	150
POWER SETTING, CORRECTED HP.	0.00	79.74	198.11	0.00	45.69
N1 SPEED, RPM	41630.00	41530.00	41220.00	41050.00	41050.00
FUEL FLOW (MEAS.) LB./HR.	146.00	182.00	248.00	280.00	280.00
ENGINE CORE INLET AIRFLOW (CALC.) LB./SEC.	6.15	6.03	5.47	6.69	6.68
COMPRESSOR INLET TEMP., DEG. F	90.0	90.0	90.0	90.0	90.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	62.36	62.60	61.87	52.29	54.70
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	367.00	375.00	367.00	335.00	341.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.28	1.96
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	58.72	53.27
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	365.00	366.00
ENGINE EXHAUST GAS TEMP., DEG. F	456.0	563.0	785.0	1021.0	979.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	129.000	84.000	22.500	3.000	6.300
CARBON MONOXIDE (CO), PPMV	243.686	260.606	282.571	215.616	259.602
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.700	18.500	32.000	47.000	42.200
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.339	1.721	2.618	3.786	3.513
NITRIC OXIDE (NO), PPMV	10.200	10.500	26.200	42.500	36.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.755	5.492	.975	.092	.284
CARBON MONOXIDE (CO)	35.545	29.809	21.416	11.612	14.722
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.283	3.476	3.984	4.158	3.931
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.570	1.000	.242	.026	.057
CARBON MONOXIDE (CO)	5.198	5.425	5.311	3.251	4.122
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.479	.633	.988	1.164	1.101
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.69	195.49	0.00	45.69
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	213.75	184.65
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.69	195.49	213.75	229.74
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.22	98.82	99.41	99.72	99.64
F/A (EMISSIONS)	.007	.008	.013	.018	.017

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-6-75 FUEL=AV. KERO. P BARO= 28.68
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41738. DEW PT,F= 68. REL HUM= 48.80 SPEC HUM= .015888
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO,L/M= 14.168 SL TIM,S= 6.5888

DATA POINT NUMBER	146	147	148	149	150
PERCENT MAX. CORRECTED POWER	0.0	39.9	99.1	0.0	22.8
CORRECTED SHAFT HP	0.0	79.7	198.1	0.0	45.7
MEASURED SHAFT HP	0.0	76.7	195.5	0.0	45.1
EXHAUST GAS TEMP., DEG.F	456.0	563.0	765.0	1021.0	979.0
SHAFT SPEED, N1, RPM	41690.0	41530.0	41220.0	41050.0	41050.0
COMPRESSOR DSCHG. PRES.,PSIA	62.4	62.6	61.9	52.3	54.7
COMPRESSOR DSCHG. TEMP,DEG F	367.0	375.0	387.0	335.0	341.0
EXHAUST GAS PRESS., PSIA	13.61	13.69	13.81	13.79	13.80
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.448	2.187
COMPRESSOR MAP FLOW,LB/SEC	6.27	6.22	5.47	6.67	6.57
FA RATIO BASED ON MAP FLOW	.0065	.0081	.0126	.0177	.0169
CORRECTED FUEL FLOW , LB/HR	146.8	182.8	248.8	288.8	288.8
FA RATIO CALC. FROM EMISSION	.0066	.0084	.0126	.0176	.0168
EQUIVALENCE RATIO	.097	.123	.185	.259	.246
LOADING W/P**N/V/E(T/548)	.393	.381	.335	.397	.381
COMB EFFIC FROM EMISSIONS	98.228	98.617	99.411	99.719	99.636

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.34	1.72	2.62	3.71	3.51
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.12	3.14	3.13
WEIGHT FLOW, LB./HR.	448.8	562.8	773.2	876.8	876.5
CARBON MONOXIDE					
PPM BY VOLUME, WET	243.7	268.6	282.6	215.6	259.6
LB. PER 1000 LB. OF FUEL	35.545	29.889	21.416	11.612	14.722
WEIGHT FLOW, LB./HR.	5.198	5.425	5.311	3.251	4.122
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	129.8	84.8	22.5	3.8	6.3
LB. PER 1000 LB. OF FUEL	10.755	5.492	.975	.092	.284
WEIGHT FLOW, LB./HR.	1.578	1.888	.242	.026	.057
RATIO LB HC/LB CO	.3026	.1842	.0455	.0088	.0139
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	18.2	18.5	26.2	42.5	38.8
LB. PER 1888 LB. OF FUEL	2.444	1.973	3.262	3.768	3.548
WEIGHT FLOW, LB./HR.	.337	.359	.889	1.853	.991
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.5	8.8	5.8	4.5	4.2
LB. PER 1888 LB. OF FUEL	.839	1.583	.722	.398	.391
WEIGHT FLOW, LB./HR.	.122	.274	.179	.111	.118
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.7	18.5	32.8	47.8	42.2
LB. PER 1888 LB. OF FUEL	3.283	3.476	3.984	4.156	3.931
WEIGHT FLOW, LB./HR.	.479	.633	.988	1.164	1.181
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.88788	.88787	.88788	.88787	.88787
SMOKE NUMBER	14.58	16.98	19.38	22.98	19.38
CORRECTED WEIGHT FLOW	.82125	.82122	.82125	.82128	.82128
SMOKE NUMBER	29.58	29.58	34.38	42.28	37.38
CORRECTED WEIGHT FLOW	.83542	.83537	.83541	.83533	.83533
SMOKE NUMBER	39.28	43.48	45.28	51.28	48.28
CORRECTED WEIGHT FLOW	.84959	.84952	.84957	.84947	.84947
SMOKE NUMBER	44.68	49.48	54.28	59.88	54.28
SMOKE NUMBER AT WA=0.823	32.18	35.18	38.58	42.18	39.88

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.811).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-6-75 FUEL=AV. KERO. P BARO= 28.68

DATA POINT NUMBER	146	147	148	149	150
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.198	5.425	5.311	3.251	4.122
UNBURNED HYDROCARBONS	1.570	1.000	.242	.026	.057
OXIDES OF NITROGEN	.479	.633	.988	1.164	1.101
NITRIC OXIDE	.357	.359	.809	1.053	.991
POWER LEVEL HP	0.00	78.69	195.49	213.75	229.74
TOTAL CORRECTED HORSEPOWER	0.00	79.74	198.11	229.56	244.88
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	68.948	27.169	15.218	17.942
UNBURNED HYDROCARBONS	0.000	12.703	1.237	.121	.249
OXIDES OF NITROGEN	0.000	8.040	5.054	5.446	4.791
NITRIC OXIDE	0.000	4.563	4.138	4.925	4.314

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-7-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 280. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.838	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	10.878	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.861	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 11 DATE: 6-7-75 TIME: 15:45 BARO. PRESS.: 28.560 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 65.00 PERCENT SPECIFIC HUMIDITY: .020080 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	151	152	153	154	155
POWER SETTING, CORRECTED HP.	0.00	78.92	198.62	0.00	45.79
N1 SPEED, RPM	41580.00	41430.00	41090.00	40910.00	40880.00
FUEL FLOW (MEAS.) LB./HR.	148.00	185.00	254.00	295.00	305.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.15	6.02	5.43	6.49	6.44
COMPRESSOR INLET TEMP., DEG. F	90.0	91.0	91.0	91.0	90.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.67	62.36	61.37	50.67	52.70
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	334.00	342.00	343.00	386.00	387.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.49	2.27
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.35	50.02
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	341.00	342.00
ENGINE EXHAUST GAS TEMP., DEG. F	459.0	562.0	795.0	1135.0	1132.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	147.000	87.000	22.500	2.700	.900
CARBON MONOXIDE (CO), PPMV	255.592	272.273	293.820	196.765	183.784
TOTAL OXIDES OF NITROGEN (NOX), PPMV	12.400	17.500	31.000	50.100	50.800
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.355	1.751	2.696	4.323	4.267
NITRIC OXIDE (NO), PPMV	6.000	10.000	25.000	43.000	47.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	12.085	5.585	.946	.871	.824
CARBON MONOXIDE (CO)	36.763	30.581	21.550	9.895	8.569
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.930	3.229	3.745	3.804	3.829
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.789	1.033	.240	.021	.007
CARBON MONOXIDE (CO)	5.441	5.657	5.474	2.683	2.614
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.434	.597	.951	1.122	1.168
ENGINE WORK OUTPUT, MEAS. SHP	0.00	77.62	195.35	0.00	45.00
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	212.22	195.25
ENGINE WORK OUTPUT, TOTAL HP	0.00	77.62	195.35	212.22	240.25
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.00	98.79	99.41	99.76	99.80
F/A (EMISSIONS)	.007	.009	.013	.020	.020

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-7-75 FUEL= AV. KERO. P BARO= 28.56
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41730. DEW PT,F= 77. REL HUM= 65.00 SPEC HUM= .020000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S AN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	151	152	153	154	155
PERCENT MAX. CORRECTED POWER	0.0	39.5	99.3	0.0	22.9
CORRECTED SHAFT HP	0.0	78.9	198.6	0.0	45.8
MEASURED SHAFT HP	0.0	77.6	195.4	0.0	45.0
EXHAUST GAS TEMP., DEG.F	459.0	562.0	795.0	1135.0	1132.9
SHAFT SPEED, N1, RPM	41580.0	41430.0	41090.0	40910.0	40880.0
COMPRESSOR DSCHG. PRES.,PSIA	61.9	62.4	61.4	50.7	52.0
COMPRESSOR DSCHG. TEMP,DEG F	334.0	342.0	343.0	306.0	307.0
EXHAUST GAS PRESS., PSIA	13.59	13.64	13.76	13.76	13.76
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.667	2.458
COMPRESSOR MAP FLOW,LB/SEC	6.29	6.07	5.28	6.47	6.42
FA RATIO BASED ON MAP FLOW	.0065	.0085	.0134	.0206	.0204
CORRECTED FUEL FLOW , LB/HR	148.0	185.0	254.0	295.0	305.0
FA RATIO CALC. FROM EMISSION	.0067	.0085	.0130	.0205	.0203
EQUIVALENCE RATIO	.098	.125	.190	.300	.298
LOADING W/P**N/V/E(T/540)	.425	.399	.356	.482	.389
COMB EFFIC FROM EMISSIONS	98.075	98.791	99.410	99.780	99.796

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.36	1.75	2.78	4.32	4.29
LB. CO2 PER LB. OF FUEL	3.06	3.09	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	453.3	571.8	791.9	926.2	957.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	255.6	272.3	293.0	196.8	183.8
LB. PER 1000 LB. OF FUEL	36.763	30.581	21.550	9.095	8.569
WEIGHT FLOW, LB./HR.	5.441	5.657	5.474	2.683	2.614
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	147.8	87.0	22.5	2.7	.9
LB. PER 1000 LB. OF FUEL	12.085	5.585	.946	.071	.024
WEIGHT FLOW, LB./HR.	1.799	1.033	.248	.021	.007
RATIO LB HC/LB CO	.3287	.1826	.0439	.0078	.0028
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	6.0	10.0	25.0	43.8	47.5
LB. PER 1000 LB. OF FUEL	1.418	1.845	3.828	3.326	3.638
WEIGHT FLOW, LB./HR.	.210	.341	.767	.981	1.110
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	6.4	7.5	6.8	6.3	2.5
LB. PER 1000 LB. OF FUEL	1.512	1.384	.725	.478	.191
WEIGHT FLOW, LB./HR.	.224	.256	.184	.141	.058
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	12.4	17.5	31.8	50.1	50.0
LB. PER 1000 LB. OF FUEL	2.933	3.229	3.745	3.804	3.829
WEIGHT FLOW, LB./HR.	.434	.597	.951	1.122	1.168
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00734	.00705	.00705	.00707	.00707
SMOKE NUMBER	11.48	15.18	15.78	22.98	24.18
CORRECTED WEIGHT FLOW	.02111	.02111	.02115	.02122	.02121
SMOKE NUMBER	25.30	31.30	32.50	42.80	43.40
CORRECTED WEIGHT FLOW	.03519	.03525	.03525	.03536	.03535
SMOKE NUMBER	32.58	38.68	41.08	52.48	54.28
CORRECTED WEIGHT FLOW	.04926	.04935	.04935	.04951	.04948
SMOKE NUMBER	38.68	45.88	47.88	60.28	61.48
SMOKE NUMBER AT WA=8.823	27.28	33.08	34.38	44.18	46.18

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 998168-3 TEST DATE 6-7-75 FUEL= AV. KERO. P BARO= 28.56

DATA POINT NUMBER	151	152	153	154	155
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.441	5.657	5.474	2.683	2.614
UNBURNED HYDROCARBONS	1.789	1.033	.248	.021	.887
OXIDES OF NITROGEN	.434	.597	.951	1.122	1.168
NITRIC OXIDE	.210	.341	.767	.981	1.118
POWER LEVEL HP	0.00	77.62	195.35	212.22	248.25
TOTAL CORRECTED HORSEPOWER	0.00	78.92	198.62	229.08	256.36
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	72.884	28.028	12.643	10.878
UNBURNED HYDROCARBONS	0.000	13.311	1.238	.099	.038
OXIDES OF NITROGEN	0.000	7.695	4.869	5.288	4.861
NITRIC OXIDE	0.000	4.397	3.927	4.623	4.648

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-7-75
MODEL NO.: GTCP85-98CK S/N: 36173 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
FUEL: ASTM D1655-73 MAX SHP 289. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********

********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.050	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	10.937	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.911	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 11 DATE: 6-7-75 TIME: 21:00 BARO. PRESS.: 28.560 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 65.00 PERCENT SPECIFIC HUMIDITY: .020000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	156	157	158	159	160
POWER SETTING, CORRECTED HP.	0.00	79.54	198.94	0.00	45.78
N1 SPEED, RPM	41630.00	41460.00	41160.00	40930.00	40870.00
FUEL FLOW (MEAS.) LB./HR.	150.00	165.00	254.00	295.00	305.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.24	5.91	5.49	6.56	6.42
COMPRESSOR INLET TEMP., DEG. F	90.0	90.0	90.0	90.0	90.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.67	62.60	61.62	50.82	52.63
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	338.00	342.00	357.00	306.00	308.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.50	2.28
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.35	50.92
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	342.00	343.00
ENGINE EXHAUST GAS TEMP., DEG. F	452.0	562.0	782.0	1122.0	1131.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	145.500	67.000	23.700	3.300	1.500
CARBON MONOXIDE (CO), PPMV	252.100	274.634	287.776	199.101	186.552
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.000	17.100	30.200	50.100	51.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.355	1.782	2.671	4.251	4.300
NITRIC OXIDE (NO), PPMV	9.200	11.200	24.000	47.000	48.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	11.966	5.489	1.006	.889	.849
CARBON MONOXIDE (CO)	36.274	38.338	21.377	9.357	8.654
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.073	3.101	3.685	3.867	3.886
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.795	1.816	.256	.026	.012
CARBON MONOXIDE (CO)	5.441	5.612	5.430	2.760	2.639
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.461	.574	.936	1.141	1.185
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.16	195.49	0.00	44.99
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	214.70	196.35
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.16	195.49	214.70	241.34
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.18	98.80	99.41	99.77	99.79
F/A (EMISSIONS)	.007	.009	.013	.020	.020

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36173 COMB P/N=698168-3 TEST DATE 6-7-75 FUEL=AV. KERO P BARO= 28.56
RAT SHP= 280. RA EGT,F= 1158. RAT SPD= 41730. DEM PT,F= 77. REL HUM= 65.00 SPEC HUM= .020000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S AN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	156	157	158	159	160
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.5	0.0	22.9
CORRECTED SHAFT HP	0.0	79.5	198.9	0.0	45.8
MEASURED SHAFT HP	0.0	78.2	195.5	0.0	45.0
EXHAUST GAS TEMP., DEG.F	452.0	562.0	762.0	1122.0	1131.0
SHAFT SPEED, N1, RPM	41630.0	41460.0	41160.0	40930.0	40870.0
COMPRESSOR DSCHG. PRES.,PSIA	61.9	62.6	61.6	58.8	52.8
COMPRESSOR DSCHG. TEMP,DEG F	338.0	342.0	357.0	386.0	388.0
EXHAUST GAS PRESS., PSIA	13.59	13.64	13.75	13.76	13.76
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.695	2.455
COMPRESSOR MAP FLOW,LB/SEC	6.11	5.94	5.33	6.67	6.42
FA RATIO BASED ON MAP FLOW	.0068	.0067	.0132	.0197	.0205
CORRECTED FUEL FLOW , LB/HR	150.9	185.8	254.0	295.8	305.8
FA RATIO CALC. FROM EMISSION	.0067	.0067	.0129	.0202	.0204
EQUIVALENCE RATIO	.098	.127	.188	.296	.299
LOADING W/P**N/V/E(T/540)	.418	.387	.348	.419	.387
COMB EFFIC FROM EMISSIONS	98.097	98.805	99.489	99.772	99.793

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.36	1.78	2.67	4.25	4.31
LB. CO2 PER LB. OF FUEL	3.96	3.09	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	459.6	571.9	791.9	926.8	957.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	252.1	274.8	287.8	199.1	186.6
LB. PER 1000 LB. OF FUEL	36.274	38.338	21.377	9.357	8.654
WEIGHT FLOW, LB./HR.	5.441	5.612	5.438	2.760	2.639
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	145.5	87.8	23.7	3.3	1.5
LB. PER 1000 LB. OF FUEL	11.966	5.489	1.886	.869	.848
WEIGHT FLOW, LB./HR.	1.795	1.016	.256	.826	.812
RATIO LB HC/LB CO	.3299	.1809	.0471	.0895	.0846
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.2	11.2	24.3	47.8	48.8
LB. PER 1000 LB. OF FUEL	2.174	2.031	3.026	3.628	3.658
WEIGHT FLOW, LB./HR.	.326	.376	.769	1.078	1.116
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.8	5.9	5.4	3.1	3.8
LB. PER 1000 LB. OF FUEL	.898	1.078	.659	.239	.229
WEIGHT FLOW, LB./HR.	.135	.198	.167	.071	.070
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.0	17.1	30.2	50.1	51.8
LB. PER 1000 LB. OF FUEL	3.073	3.101	3.685	3.867	3.886
WEIGHT FLOW, LB./HR.	.461	.574	.936	1.141	1.185
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08738	.08789	.08787	.08787	.08783
SMOKE NUMBER	9.68	14.50	19.30	22.30	24.18
CORRECTED WEIGHT FLOW	.02128	.02127	.02122	.02121	.02113
SMOKE NUMBER	24.18	38.18	32.58	42.28	43.48
CORRECTED WEIGHT FLOW	.03545	.03545	.03536	.03541	.03521
SMOKE NUMBER	32.58	48.48	41.68	51.88	54.28
CORRECTED WEIGHT FLOW	.04963	.04963	.04951	.04956	.04935
SMOKE NUMBER	38.68	52.48	48.88	59.68	61.48
SMOKE NUMBER AT WA=8.823	26.48	34.68	35.88	44.38	46.28

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36173 COMB P/N=698168-3 TEST DATE 6-7-75 FUEL=AV. KERO P BARO= 28.56

DATA POINT NUMBER	156	157	158	159	160
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.441	5.612	5.430	2.760	2.639
UNBURNED HYDROCARBONS	1.735	1.016	.256	.026	.012
OXIDES OF NITROGEN	.461	.574	.936	1.141	1.185
NITRIC OXIDE	.326	.376	.769	1.078	1.116
POWER LEVEL HP	0.00	78.16	195.49	214.78	241.34
TOTAL CORRECTED HORSEPOWER	0.00	79.54	198.94	231.55	257.54
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	71.684	27.775	12.856	10.937
UNBURNED HYDROCARBONS	0.000	12.992	1.307	.122	.058
OXIDES OF NITROGEN	0.000	7.333	4.788	5.314	4.911
NITRIC OXIDE	0.000	4.807	3.932	4.985	4.622

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-7-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.051	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	10.929	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.954	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 11 DATE: 6-7-75 TIME: 2230 BARO. PRESS.: 28.580 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 65.00 PERCENT SPECIFIC HUMIDITY: .020000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.58 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	161	162	163	164	165
POWER SETTING, CORRECTED HP.	0.00	79.88	198.82	0.00	46.21
N1 SPEED, RPM	41640.00	41460.00	41160.00	40920.00	40680.00
FUEL FLOW (MEAS.) LB./HR.	150.00	186.00	254.00	295.00	308.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.00	5.96	5.49	6.58	6.45
COMPRESSOR INLET TEMP., DEG. F	92.0	90.0	91.0	90.0	91.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.87	62.60	61.62	50.82	52.96
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	337.00	340.00	357.00	305.00	308.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.51	2.28
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.10	51.06
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	341.00	343.00
ENGINE EXHAUST GAS TEMP., DEG. F	453.0	560.0	782.0	1116.0	1123.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	157.500	93.000	23.400	3.000	1.500
CARBON MONOXIDE (CO), PPMV	267.179	265.169	282.571	196.765	185.167
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.200	17.700	31.000	50.100	51.100
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.388	1.778	2.671	4.244	4.323
NITRIC OXIDE (NO), PPMV	10.500	12.100	26.100	47.400	48.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	12.630	5.877	.994	.881	.848
CARBON MONOXIDE (CO)	37.483	31.527	20.995	9.263	8.562
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.042	3.214	3.783	3.874	3.881
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.894	1.833	.252	.824	.812
CARBON MONOXIDE (CO)	5.622	5.864	5.333	2.733	2.637
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.456	.598	.961	1.143	1.195
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.55	195.68	0.00	45.46
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	214.53	195.88
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.55	195.68	214.53	241.27
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.01	98.74	99.42	99.78	99.88
F/A (EMISSIONS)	.007	.009	.013	.020	.020

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-7-75 FUEL=AV. KERO. P BARO= 28.58
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41730. DEW PT,F= 77. REL HUM= 65.00 SPEC HUM= .020000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S AN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	161	162	163	164	165
PERCENT MAX. CORRECTED POWER	0.0	39.9	99.4	0.0	23.1
CORRECTED SHAFT HP	0.0	79.9	198.8	0.0	46.2
MEASURED SHAFT HP	0.0	78.6	195.7	0.0	45.5
EXHAUST GAS TEMP., DEG.F	453.0	560.0	782.0	1116.0	1123.0
SHAFT SPEED, N1, RPM	41640.0	41460.0	41160.0	40928.0	40880.0
COMPRESSOR DSCHG. PRES.,PSIA	61.9	62.6	61.6	50.8	53.0
COMPRESSOR DSCHG. TEMP,DEG F	337.0	340.0	357.0	385.0	388.0
EXHAUST GAS PRESS., PSIA	13.59	13.64	13.75	13.76	13.76
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.701	2.458
COMPRESSOR MAP FLOW,LB/SEC	6.11	5.91	5.36	6.47	6.42
FA RATIC BASED ON MAP FLOW	.0068	.0087	.0132	.0207	.0207
CORRECTED FUEL FLOW , LB/HR	150.0	186.0	254.0	295.0	308.0
FA RATIO CALC. FROM EMISSION	.0068	.0087	.0129	.0201	.0205
EQUIVALENCE RATIO	.108	.127	.186	.295	.300
LOADING W/P**N/V/E(T/548)	.418	.387	.349	.399	.385
COMB EFFIC FROM EMISSIONS	98.010	98.743	99.419	99.775	99.795

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.39	1.78	2.67	4.24	4.32
LB. CO2 PER LB. OF FUEL	3.06	3.09	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	459.1	574.4	792.1	926.1	967.3
CARBON MONOXIDE					
PPM BY VOLUME, WET	267.2	285.2	282.6	196.8	185.2
LB. PER 1000 LB. OF FUEL	37.483	31.527	20.995	9.263	8.562
WEIGHT FLOW, LB./HR.	5.622	5.864	5.333	2.733	2.637
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	157.5	93.8	23.4	3.8	1.5
LB. PER 1000 LB. OF FUEL	12.630	5.677	.994	.081	.048
WEIGHT FLOW, LB./HR.	1.894	1.093	.252	.024	.012
RATIO LB HC/LB CO	.3369	.1864	.0473	.0087	.0046
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	18.5	12.1	26.1	47.4	48.8
LB. PER 1000 LB. OF FUEL	2.428	2.197	3.185	3.665	3.646
WEIGHT FLOW, LB./HR.	.363	.409	.809	1.081	1.123
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.7	5.6	4.9	2.7	3.1
LB. PER 1000 LB. OF FUEL	.622	1.017	.598	.209	.235
WEIGHT FLOW, LB./HR.	.093	.189	.152	.062	.073
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.2	17.7	31.0	50.1	51.1
LB. PER 1000 LB. OF FUEL	3.042	3.214	3.783	3.874	3.881
WEIGHT FLOW, LB./HR.	.456	.598	.961	1.143	1.195
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08705	.08705	.08705	.08704	.08706
SMOKE NUMBER	9.60	15.70	16.30	22.30	27.10
CORRECTED WEIGHT FLOW	.02115	.02115	.02114	.02112	.02118
SMOKE NUMBER	26.50	30.10	32.50	41.00	44.60
CORRECTED WEIGHT FLOW	.03525	.03525	.03530	.03527	.03530
SMOKE NUMBER	33.70	39.80	42.20	58.60	54.80
CORRECTED WEIGHT FLOW	.04935	.04944	.04942	.04938	.04939
SMOKE NUMBER	40.40	45.80	47.60	59.60	61.40
SMOKE NUMBER AT WA=0.023	27.30	33.10	34.90	43.70	47.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36173 COMB P/N=698168-3 TEST DATE 6-7-75 FUEL=AV. KERO. P BARO= 28.58

DATA POINT NUMBER	161	162	163	164	165
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.622	5.864	5.333	2.733	2.637
UNBURNED HYDROCARBONS	1.894	1.093	.252	.024	.012
OXIDES OF NITROGEN	.456	.598	.961	1.143	1.195
NITRIC OXIDE	.363	.409	.809	1.081	1.123
POWER LEVEL HP	0.00	78.55	195.68	214.53	241.27
TOTAL CORRECTED HORSEPOWER	0.00	79.86	198.82	231.21	257.41
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	74.651	27.251	12.737	10.929
UNBURNED HYDROCARBONS	0.000	13.915	1.298	.111	.051
OXIDES OF NITROGEN	0.000	7.611	4.911	5.327	4.954
NITRIC OXIDE	0.000	5.203	4.135	5.040	4.654

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-18-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.207	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	12.188	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.778	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: /.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 12 DATE: 6-18-75 TIME: 10.45 BARO. PRESS.: 28.440 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 79.00 PERCENT SPECIFIC HUMIDITY: .025000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	166	167	168	169	170
POWER SETTING, CORRECTED HP.	0.00	79.58	198.22	0.00	45.85
N1 SPEED, RPM	41590.00	41380.00	41010.00	40820.00	40720.00
FUEL FLOW (MEAS.) LB./HR.	155.00	190.00	260.00	295.00	310.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	6.09	5.86	5.25	6.45	6.42
COMPRESSOR INLET TEMP., DEG. F	91.0	92.0	93.0	91.0	89.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.96	61.67	60.15	58.97	53.27
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	331.00	336.00	327.00	302.00	268.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.52	2.29
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.35	51.31
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	342.00	330.00
ENGINE EXHAUST GAS TEMP., DEG. F	478.0	583.0	838.0	1147.0	1148.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	177.000	109.500	27.000	7.500	6.000
CARBON MONOXIDE (CO), PPMV	282.571	328.118	306.306	283.798	281.443
TOTAL OXIDES OF NITROGEN (NOX), PPMV	12.000	16.000	29.000	47.000	48.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.430	1.840	2.862	4.395	4.395
NITRIC OXIDE (NO), PPMV	10.000	9.000	28.500	47.000	48.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	13.761	6.668	1.878	.195	.156
CARBON MONOXIDE (CO)	38.434	34.958	21.238	9.263	9.157
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.681	2.888	3.383	3.589	3.584
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	2.133	1.267	.278	.057	.048
CARBON MONOXIDE (CO)	5.957	6.642	5.522	2.733	2.839
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.416	.532	.859	1.035	1.111
ENGINE WORK OUTPUT, MEAS. SHP	0.00	78.01	194.49	0.00	44.82
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	215.49	188.10
ENGINE WORK OUTPUT, TOTAL HP	0.00	78.01	194.49	215.49	232.92
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.69	98.59	99.41	99.76	99.77
F/A (EMISSIONS)	.007	.009	.014	.021	.021

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-18-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 84. FUEL=AV. KERO. P BARO= 28.44
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 REL HUM= 79.00 SPEC HUM= .025000
FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	166	167	168	169	170
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.1	0.0	22.9
CORRECTED SHAFT HP	0.0	79.6	198.2	0.0	45.8
MEASURED SHAFT HP	0.0	78.0	194.5	0.0	44.8
EXHAUST GAS TEMP., DEG.F	478.0	583.0	830.0	1147.0	1148.0
SHAFT SPEED, N1, RPM	41590.0	41380.0	41010.0	40820.0	40720.0
COMPRESSOR DSCHG. PRES.,PSIA	62.0	61.7	60.1	51.0	53.3
COMPRESSOR DSCHG. TEMP,DEG F	331.0	336.0	327.0	302.0	286.0
EXHAUST GAS PRESS., PSIA	13.53	13.61	13.75	13.74	13.73
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.729	2.477
COMPRESSOR MAP FLOW,LB/SEC	5.74	5.49	4.96	6.17	6.11
FA RATIO BASED ON MAP FLOW	.0075	.0096	.0146	.0224	.0226
CORRECTED FUEL FLOW , LB/HR	155.0	190.0	260.0	295.0	310.0
FA RATIO CALC. FROM EMISSION	.0071	.0090	.0136	.0208	.0288
EQUIVALENCE RATIO	.104	.132	.202	.305	.305
LOADING W/P**N/V/E(T/540)	.389	.371	.357	.368	.365
COMB EFFIC FROM EMISSIONS	97.889	98.593	99.407	99.765	99.771

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.43	1.84	2.86	4.48	4.48
LB. CO2 PER LB. OF FUEL	3.06	3.08	3.12	3.14	3.14
WEIGHT FLOW, LB./HR.	473.7	585.4	810.6	926.0	973.2
CARBON MONOXIDE					
PPM BY VOLUME, WET	282.6	328.1	306.3	203.8	201.4
LB. PER 1000 LB. OF FUEL	38.434	34.958	21.238	9.263	9.157
WEIGHT FLOW, LB./HR.	5.957	6.642	5.522	2.733	2.839
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	177.0	109.5	27.0	7.5	6.0
LB. PER 1000 LB. OF FUEL	13.761	6.668	1.870	.195	.156
WEIGHT FLOW, LB./HR.	2.133	1.267	.278	.057	.048
RATIO LB HC/LB CO	.3580	.1907	.0504	.0210	.0170
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.0	9.8	28.5	47.0	46.8
LB. PER 1000 LB. OF FUEL	2.234	1.715	3.246	3.589	3.584
WEIGHT FLOW, LB./HR.	.346	.326	.844	1.035	1.111
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.0	6.2	.5	0.0	0.0
LB. PER 1000 LB. OF FUEL	.447	1.085	.057	0.000	0.000
WEIGHT FLOW, LB./HR.	.069	.206	.015	0.000	0.000
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	12.0	16.0	29.0	47.0	46.8
LB. PER 1000 LB. OF FUEL	2.681	2.800	3.303	3.589	3.584
WEIGHT FLOW, LB./HR.	.416	.532	.859	1.035	1.111
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00710	.00708	.00708	.00706	.00705
SMOKE NUMBER	25.30	21.70	31.30	27.70	28.90
CORRECTED WEIGHT FLOW	.02129	.02125	.02123	.02119	.02115
SMOKE NUMBER	32.50	36.10	44.60	44.60	47.00
CORRECTED WEIGHT FLOW	.03548	.03542	.03538	.03532	.03532
SMOKE NUMBER	42.20	47.00	47.00	56.60	59.00
CORRECTED WEIGHT FLOW	.04968	.04966	.04955	.04951	.04931
SMOKE NUMBER	47.00	54.20	56.60	66.30	68.70
SMOKE NUMBER AT WA=0.023	36.90	40.00	45.10	49.10	51.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N=698168-3 TEST DATE 6-18-75 FUEL=AV. KERO. P BARO= 28.44

DATA POINT NUMBER	166	167	168	169	170
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.957	6.642	5.522	2.733	2.639
UNBURNED HYDROCARBONS	2.133	1.267	.278	.057	.048
OXIDES OF NITROGEN	.416	.532	.859	1.835	1.111
NITRIC OXIDE	.346	.326	.844	1.835	1.111
POWER LEVEL HP	0.00	78.01	194.49	215.49	232.92
TOTAL CORRECTED HORSEPOWER	0.00	79.58	198.22	233.60	249.38
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	85.133	28.392	12.681	12.188
UNBURNED HYDROCARBONS	0.000	16.240	1.430	.267	.207
OXIDES OF NITROGEN	0.000	6.820	4.415	4.804	4.770
NITRIC OXIDE	0.000	4.177	4.339	4.804	4.770

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-18-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **

HYDROCARBONS (HC AS CH4)	.211	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	19.501	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.596	LB. POLLUTANT PER 1000 HP.-HR.

** ENGINE DESCRIPTION **
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**OPERATIONAL TEST DATA SUMMARY **
GASEOUS EMISSION TEST NO.: 12 DATE: 6-18-75 TIME: 13.15 BARO. PRESS.: 28.440 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 79.00 PERCENT SPECIFIC HUMIDITY: .025000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

** COMPUTED EMISSIONS **

TEST CONDITION	171	172	173	174	175
POWER SETTING, CORRECTED HP.	0.00	79.56	198.35	0.00	45.71
N1 SPEED, RPM	41550.00	41370.00	41000.00	40620.00	40710.00
FUEL FLOW (MEAS.) LB./HR.	153.00	190.00	260.00	294.00	310.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.85	5.69	5.20	6.49	6.32
COMPRESSOR INLET TEMP., DEG. F	90.0	92.0	92.0	92.0	92.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.62	61.37	59.98	58.77	53.27
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	330.00	334.00	342.00	315.00	288.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.50	2.23
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	48.95	51.78
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	358.00	331.00
ENGINE EXHAUST GAS TEMP., DEG. F	472.0	585.0	830.0	1157.0	1154.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	165.000	109.500	24.000	6.000	6.000
CARBON MONOXIDE (CO), PPMV	290.393	339.296	311.693	196.765	317.124
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.000	17.000	30.000	52.000	45.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.472	1.899	2.890	4.323	4.432
NITRIC OXIDE (NO), PPMV	13.000	16.000	30.000	52.000	45.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	12.478	6.463	.942	.159	.154
CARBON MONOXIDE (CO)	38.420	35.036	21.404	9.095	14.261
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.825	2.884	3.364	3.948	3.361
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.909	1.228	.245	.047	.048
CARBON MONOXIDE (CO)	5.878	6.657	5.565	2.674	4.421
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.432	.548	.868	1.161	1.042
ENGINE WORK OUTPUT, MEAS. SHP	0.00	77.99	194.44	0.00	44.81
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	220.24	181.98
ENGINE WORK OUTPUT, TOTAL HP	0.00	77.99	194.44	220.24	226.71
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.08	98.61	99.41	99.77	99.65
F/A (EMISSIONS)	.007	.009	.014	.020	.021

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-18-75 FUEL=AV. KERO. P BARO= 28.44
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 84. REL HUM= 79.80 SPEC HUM= .025000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 308.8 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	171	172	173	174	175
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.2	0.0	22.9
CORRECTED SHAFT HP	0.0	79.6	198.4	0.0	45.7
MEASURED SHAFT HP	0.0	78.8	194.4	0.0	44.8
EXHAUST GAS TEMP., DEG.F	472.0	585.8	830.0	1157.0	1154.0
SHAFT SPEED, N1, RPM	41550.0	41370.0	41080.0	40820.0	40710.0
COMPRESSOR DSCHG. PRES.,PSIA	61.6	61.4	59.9	50.8	53.3
COMPRESSOR DSCHG. TEMP,DEG F	330.0	334.0	342.0	315.0	286.0
EXHAUST GAS PRESS., PSIA	13.54	13.61	13.74	13.74	13.76
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.716	2.422
COMPRESSOR MAP FLOW,LB/SEC	5.76	5.49	4.93	6.15	6.06
FA RATIO BASED ON MAP FLOW	.0074	.0096	.0146	.0224	.0225
CORRECTED FUEL FLOW , LB/HR	153.0	190.0	260.0	294.0	310.0
FA RATIO CALC. FROM EMISSION	.0073	.0093	.0139	.0205	.0211
EQUIVALENCE RATIO	.106	.136	.204	.300	.309
LOADING W/P**N/V/E(T/548)	.395	.376	.348	.361	.366
COMB EFFIC FROM EMISSIONS	98.002	98.609	99.414	99.772	99.651

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.47	1.98	2.89	4.32	4.43
LB. CO2 PER LB. OF FUEL	3.06	3.88	3.12	3.14	3.13
WEIGHT FLOW, LB./HR.	468.1	585.4	810.6	923.0	970.7
CARBON MONOXIDE					
PPM BY VOLUME, WET	298.4	339.3	311.7	196.8	317.1
LB. PER 1000 LB. OF FUEL	38.420	35.036	21.404	9.895	14.261
WEIGHT FLOW, LB./HR.	5.878	6.657	5.565	2.674	4.421
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	165.8	109.5	24.8	6.8	6.8
LB. PER 1000 LB. OF FUEL	12.478	6.483	.942	.159	.154
WEIGHT FLOW, LB./HR.	1.989	1.228	.245	.047	.048
RATIO LB HC/LB CO	.3248	.1845	.0448	.0174	.0108
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.8	16.8	30.8	52.8	45.5
LB. PER 1000 LB. OF FUEL	2.825	2.714	3.384	3.948	3.361
WEIGHT FLOW, LB./HR.	.432	.516	.880	1.161	1.042
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	0.0	1.0	0.0	0.0	0.0
LB. PER 1000 LB. OF FUEL	0.000	.178	0.000	0.000	0.000
WEIGHT FLOW, LB./HR.	0.000	.032	0.000	0.000	0.000
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.8	17.0	30.8	52.8	45.5
LB. PER 1000 LB. OF FUEL	2.825	2.884	3.384	3.948	3.361
WEIGHT FLOW, LB./HR.	.432	.548	.880	1.161	1.042
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00706	.00706	.00705	.00705	.00704
SMOKE NUMBER	16.98	22.98	24.18	26.98	27.78
CORRECTED WEIGHT FLOW	.02118	.02117	.02116	.02115	.02111
SMOKE NUMBER	30.18	38.68	39.88	48.28	48.28
CORRECTED WEIGHT FLOW	.03529	.03527	.03527	.03523	.03522
SMOKE NUMBER	37.38	49.48	50.68	60.28	56.68
CORRECTED WEIGHT FLOW	.04938	.04944	.04935	.04939	.04939
SMOKE NUMBER	45.88	56.68	57.88	65.18	63.98
SMOKE NUMBER AT WA=0.023	32.88	42.28	43.48	51.88	49.58

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-16-75 FUEL=AV. KERO. P BARO= 28.44

DATA POINT NUMBER	171	172	173	174	175
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.878	6.657	5.565	2.674	4.421
UNBURNED HYDROCARBONS	1.909	1.228	.245	.047	.048
OXIDES OF NITROGEN	.432	.548	.880	1.161	1.042
NITRIC OXIDE	.432	.516	.880	1.161	1.042
POWER LEVEL HP	0.00	77.99	194.44	220.24	226.71
TOTAL CORRECTED HORSEPOWER	0.00	79.56	198.35	238.96	243.07
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	85.349	28.620	12.148	19.581
UNBURNED HYDROCARBONS	0.000	15.744	1.260	.212	.211
OXIDES OF NITROGEN	0.000	7.024	4.525	5.270	4.596
NITRIC OXIDE	0.000	6.611	4.525	5.270	4.596

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-18-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 288. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.205	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	16.291	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.463	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 12 DATE: 6-18-75 TIME: 14.55 BARO. PRESS.: 28.440 IN. HGA.
AMBIENT AIR TEMP.: 91.0 DEG. F RELATIVE HUMIDITY: 79.00 PERCENT SPECIFIC HUMIDITY: .025000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	176	177	178	179	180
POWER SETTING, CORRECTED HP.	0.00	79.54	198.25	0.00	45.72
N1 SPEED, RPM	41580.00	41320.00	40980.00	40770.00	40680.00
FUEL FLOW (MEAS.) LB./HR.	155.00	190.00	258.00	297.00	310.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.96	5.71	5.11	6.42	6.22
COMPRESSOR INLET TEMP., DEG. F	90.0	91.0	92.0	92.0	91.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	61.37	61.28	59.90	58.97	53.18
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	328.00	331.00	343.00	382.00	291.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.52	2.23
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	49.20	51.55
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	332.00	332.00
ENGINE EXHAUST GAS TEMP., DEG. F	477.0	585.0	839.0	1158.0	1160.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	168.000	180.500	24.300	6.000	6.000
CARBON MONOXIDE (CO), PPMV	295.657	319.856	322.598	213.238	306.306
TOTAL OXIDES OF NITROGEN (NOX), PPMV	10.300	16.500	30.000	47.500	45.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.463	1.895	2.918	4.461	4.542
NITRIC OXIDE (NO), PPMV	10.000	15.300	30.000	47.500	45.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	12.768	5.954	.944	.154	.151
CARBON MONOXIDE (CO)	39.312	33.154	21.934	9.549	13.445
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.258	2.809	3.351	3.494	3.261
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.979	1.131	.244	.046	.047
CARBON MONOXIDE (CO)	6.093	6.299	5.659	2.836	4.168
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.349	.534	.864	1.038	1.017
ENGINE WORK OUTPUT, MEAS. SHP	0.00	77.90	194.35	0.00	44.78
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	206.42	183.89
ENGINE WORK OUTPUT, TOTAL HP	0.00	77.90	194.35	206.42	227.87
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.96	98.70	99.40	99.76	99.67
F/A (EMISSIONS)	.007	.009	.014	.021	.022

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 838168-3 TEST DATE 6-18-75 FUEL=AV. KERO. P BARO= 28.44
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 84. REL HUM= 79.00 SPEC HUM= .025088
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5088

DATA POINT NUMBER	176	177	178	179	180
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.1	0.0	22.9
CORRECTED SHAFT HP	0.0	79.5	198.3	0.0	45.7
MEASURED SHAFT HP	0.0	77.9	194.3	0.0	44.8
EXHAUST GAS TEMP., DEG.F	477.0	585.0	839.0	1158.0	1168.0
SHAFT SPEED, N1, RPM	41500.0	41320.0	40980.0	40770.0	40680.0
COMPRESSOR DSCHG. PRES.,PSIA	61.4	61.3	59.9	51.0	53.2
COMPRESSOR DSCHG. TEMP,DEG F	328.0	331.0	343.0	302.0	291.0
EXHAUST GAS PRESS., PSIA	13.54	13.62	13.74	13.74	13.77
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.737	2.415
COMPRESSOR MAP FLOW,LB/SEC	5.72	5.44	4.87	6.15	6.08
FA RATIO BASED ON MAP FLOW	.0075	.0097	.0147	.0227	.0223
CORRECTED FUEL FLOW , LB/HR	155.0	198.0	258.0	297.0	310.0
FA RATIO CALC. FROM EMISSION	.0072	.0092	.0140	.0211	.0216
EQUIVALENCE RATIO	.106	.136	.206	.310	.316
LOADING W/P**N/V/E(T/540)	.396	.376	.342	.365	.368
COMB EFFIC FROM EMISSIONS	97.955	98.698	99.401	99.762	99.670

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.46	1.89	2.92	4.46	4.54
LB. CO2 PER LB. OF FUEL	3.06	3.09	3.12	3.14	3.13
WEIGHT FLOW, LB./HR.	473.9	586.3	804.2	932.2	971.1
CARBON MONOXIDE					
PPM BY VOLUME, WET	295.7	319.9	322.6	213.2	386.3
LB. PER 1000 LB. OF FUEL	39.312	33.154	21.934	9.549	13.445
WEIGHT FLOW, LB./HR.	6.093	6.299	5.659	2.836	4.168
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	168.0	180.5	24.3	6.0	6.0
LB. PER 1000 LB. OF FUEL	12.768	5.954	.944	.154	.151
WEIGHT FLOW, LB./HR.	1.979	1.131	.244	.046	.047
RATIO LB HC/LB CO	.3248	.1796	.0431	.0161	.0112
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	10.8	15.3	38.8	47.5	45.5
LB. PER 1000 LB. OF FUEL	2.184	2.605	3.351	3.494	3.281
WEIGHT FLOW, LB./HR.	.339	.495	.864	1.038	1.017
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	.3	1.2	0.0	0.0	0.0
LB. PER 1000 LB. OF FUEL	.066	.204	0.000	0.000	0.000
WEIGHT FLOW, LB./HR.	.010	.039	0.000	0.000	0.000
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	10.3	16.5	38.8	47.5	45.5
LB. PER 1000 LB. OF FUEL	2.250	2.809	3.351	3.494	3.281
WEIGHT FLOW, LB./HR.	.349	.534	.864	1.038	1.017
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00703	.00707	.00708	.00708	.00709
SMOKE NUMBER	18.18	21.78	22.98	32.58	27.78
CORRECTED WEIGHT FLOW	.02118	.02121	.02123	.02123	.02126
SMOKE NUMBER	28.98	38.68	41.08	50.68	45.68
CORRECTED WEIGHT FLOW	.03522	.03534	.03541	.03536	.03542
SMOKE NUMBER	41.08	49.48	50.68	57.88	57.88
CORRECTED WEIGHT FLOW	.04940	.04957	.04961	.04957	.04967
SMOKE NUMBER	47.08	54.28	56.68	67.58	65.18
SMOKE NUMBER AT WA=0.823	34.88	41.28	43.88	52.48	49.48

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-16-75 FUEL=AV. KERO. P BARO= 28.44

DATA POINT NUMBER	176	177	178	179	180
EMISSION RATE LB/HR					
CARBON MONOXIDE	6.893	6.299	5.659	2.836	4.168
UNBURNED HYDROCARBONS	1.979	1.131	.244	.046	.047
OXIDES OF NITROGEN	.349	.534	.864	1.838	1.017
NITRIC OXIDE	.339	.495	.864	1.838	1.017
POWER LEVEL HP	0.00	77.90	194.35	286.42	227.87
TOTAL CORRECTED HORSEPOWER	0.00	79.54	198.25	223.97	244.19
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	80.864	29.118	13.739	18.291
UNBURNED HYDROCARBONS	0.000	14.523	1.254	.221	.285
OXIDES OF NITROGEN	0.000	6.852	4.448	5.027	4.463
NITRIC OXIDE	0.000	6.354	4.448	5.027	4.463

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.661	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	20.906	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.855	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 13 DATE: 6-19-75 TIME: 12.40 BARO. PRESS.: 22.838 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007588 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 388.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	181	182	183	184	185
POWER SETTING, CORRECTED HP.	0.00	79.13	197.40	0.00	45.46
N1 SPEED, RPM	41770.00	41620.00	41360.00	41250.00	41220.00
FUEL FLOW (MEAS.) LB./HR.	115.00	145.00	200.00	220.00	220.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	4.79	4.65	4.29	5.52	5.36
COMPRESSOR INLET TEMP., DEG. F	61.0	60.0	59.0	61.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	48.61	47.07	47.48	42.47	44.19
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	368.00	389.00	398.00	359.00	362.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.84	1.53
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	41.49	43.06
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	383.00	386.00
ENGINE EXHAUST GAS TEMP., DEG. F	499.0	617.0	852.0	1040.0	1088.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	178.500	106.500	16.500	9.688	18.000
CARBON MONOXIDE (CO), PPMV	306.306	347.886	225.190	244.671	325.353
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	21.000	37.500	51.000	46.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.343	1.769	2.698	3.482	3.327
NITRIC OXIDE (NO), PPMV	13.000	19.488	37.000	51.000	46.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	14.718	6.735	.695	.314	.614
CARBON MONOXIDE (CO)	44.188	38.479	16.606	14.884	19.428
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.554	3.962	4.542	4.795	4.512
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.693	.977	.139	.069	.135
CARBON MONOXIDE (CO)	5.082	5.579	3.321	3.281	4.274
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.409	.574	.908	1.055	.993
ENGINE WORK OUTPUT, MEAS. SHP	0.00	68.43	150.62	0.00	34.75
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	202.44	169.69
ENGINE WORK OUTPUT, TOTAL HP	0.00	68.43	150.62	202.44	204.44
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.67	98.58	99.55	99.64	99.49
F/A (EMISSIONS)	.007	.009	.013	.017	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36173 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 22.83
RAT SHP= 280. RA EGT,F= 1150. RAT SPD= 41680. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007508
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	181	182	183	184	185
PERCENT MAX. CORRECTED POWER	0.0	39.6	98.7	0.0	22.7
CORRECTED SHAFT HP	0.0	79.1	197.4	0.0	45.5
MEASURED SHAFT HP	0.0	60.4	150.6	0.0	34.8
EXHAUST GAS TEMP., DEG.F	499.0	617.0	852.0	1040.0	1000.0
SHAFT SPEED, N1, RPM	41770.0	41620.0	41360.0	41250.0	41220.0
COMPRESSOR DSCHG. PRES.,PSIA	48.6	47.9	47.5	42.5	44.2
COMPRESSOR DSCHG. TEMP,DEG F	388.0	389.0	390.0	359.0	362.0
EXHAUST GAS PRESS., PSIA	13.74	13.79	13.88	13.88	13.89
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.421	2.011
COMPRESSOR MAP FLOW,LB/SEC	4.59	4.33	3.95	5.11	4.88
FA RATIO BASED ON MAP FLOW	.0070	.0093	.0141	.0187	.0182
CORRECTED FUEL FLOW , LB/HR	115.0	145.0	200.0	220.0	220.0
FA RATIO CALC. FROM EMISSION	.0067	.0087	.0129	.0166	.0159
EQUIVALENCE RATIO	.098	.127	.190	.244	.234
LOADING W/P**N/V/E((T/540)	.428	.414	.377	.487	.388
COMB EFFIC FROM EMISSIONS	97.669	98.504	99.548	99.643	99.489

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.34	1.77	2.70	3.46	3.33
LB. CO2 PER LB. OF FUEL	3.04	3.08	3.13	3.13	3.12
WEIGHT FLOW, LB./HR.	350.1	445.9	625.2	688.9	686.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	386.3	347.8	225.2	244.7	325.4
LB. PER 1000 LB. OF FUEL	44.188	38.479	16.686	14.884	19.428
WEIGHT FLOW, LB./HR.	5.092	5.573	3.321	3.081	4.274
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	178.5	136.5	16.5	9.6	16.8
LB. PER 1000 LB. OF FUEL	14.716	6.735	.695	.314	.614
WEIGHT FLOW, LB./HR.	1.693	.977	.139	.069	.135
RATIO LB HC/LB CO	.3331	.1758	.0419	.0224	.0316
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.8	19.4	37.8	51.8	46.8
LB. PER 1000 LB. OF FUEL	3.081	3.526	4.482	4.795	4.512
WEIGHT FLOW, LB./HR.	.354	.511	.896	1.055	.993
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.8	2.4	.5	0.0	0.0
LB. PER 1000 LB. OF FUEL	.474	.436	.061	0.000	0.000
WEIGHT FLOW, LB./HR.	.055	.063	.012	0.000	0.000
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.8	21.8	37.5	51.8	46.8
LB. PER 1000 LB. OF FUEL	3.554	3.962	4.542	4.795	4.512
WEIGHT FLOW, LB./HR.	.409	.574	.908	1.055	.993
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08784	.08783	.08783	.08784	.08783
SMOKE NUMBER	18.18	18.18	19.38	28.58	15.78
CORRECTED WEIGHT FLOW	.02113	.02109	.02109	.02112	.02108
SMOKE NUMBER	28.98	30.18	32.58	36.18	33.78
CORRECTED WEIGHT FLOW	.03521	.03514	.03513	.03520	.03520
SMOKE NUMBER	38.68	38.68	34.98	45.88	42.28
CORRECTED WEIGHT FLOW	.04928	.04911	.04918	.04926	.04927
SMOKE NUMBER	41.88	43.48	39.88	54.88	45.88
SMOKE NUMBER AT HA=0.023	31.98	32.88	31.98	39.78	34.78

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 696168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 22.83

DATA POINT NUMBER	181	182	183	184	185
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.082	5.579	3.321	3.081	4.274
UNBURNED HYDROCARBONS	1.693	.977	.139	.869	.135
OXIDES OF NITROGEN	.409	.574	.988	1.855	.993
NITRIC OXIDE	.354	.511	.896	1.855	.993
POWER LEVEL HP	0.00	60.43	158.62	282.44	284.44
TOTAL CORRECTED HORSEPOWER	0.00	79.13	197.48	269.82	268.28
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	92.323	22.058	15.219	20.906
UNBURNED HYDROCARBONS	0.000	16.159	.923	.341	.661
OXIDES OF NITROGEN	0.000	9.505	6.032	5.211	4.855
NITRIC OXIDE	0.000	8.459	5.951	5.211	4.855

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36173 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	1.214	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	24.468	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.705	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 13 DATE: 6-19-75 TIME: 14:25 BARO. PRESS.: 22.830 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	186	187	188	189	190
POWER SETTING, CORRECTED HP.	0.00	79.34	196.97	0.00	45.51
N1 SPEED, RPM	41760.00	41610.00	41310.00	41210.00	41190.00
FUEL FLOW (MEAS.) LB./HR.	114.00	144.00	200.00	220.00	220.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	4.73	4.60	4.35	5.53	5.36
COMPRESSOR INLET TEMP., DEG. F	60.0	57.0	60.0	60.0	59.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	48.36	48.12	47.38	42.57	44.53
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	386.00	386.00	398.00	354.00	358.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.65	1.54
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	41.49	43.31
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	379.00	381.00
ENGINE EXHAUST GAS TEMP., DEG. F	501.0	608.0	852.0	1022.0	992.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	186.000	189.500	17.400	12.600	33.000
CARBON MONOXIDE (CO), PPMV	317.124	362.236	222.787	244.671	379.978
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.300	21.800	38.000	51.500	44.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.347	1.773	2.661	3.462	3.327
NITRIC OXIDE (NO), PPMV	11.500	18.000	37.000	51.500	44.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	15.272	6.981	.744	.412	1.124
CARBON MONOXIDE (CO)	45.554	39.939	16.659	14.383	22.643
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.618	3.948	4.668	4.841	4.356
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.741	.994	.149	.891	.247
CARBON MONOXIDE (CO)	5.193	5.751	3.332	3.081	4.982
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.412	.569	.934	1.065	.958
ENGINE WORK OUTPUT, MEAS. SHP	0.00	60.42	150.44	0.00	34.73
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	201.48	168.93
ENGINE WORK OUTPUT, TOTAL HP	0.00	60.42	150.44	201.48	203.66
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.59	98.46	99.54	99.63	99.37
F/A (EMISSIONS)	.007	.009	.013	.017	.016

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 22.63
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41680. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007508
FUEL H/C= 1.9280 STOI F/A= .06622 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	186	187	188	189	190
PERCENT MAX. CORRECTED POWER	0.0	39.7	98.5	0.0	22.8
CORRECTED SHAFT HP	0.0	79.3	197.0	0.0	45.5
MEASURED SHAFT HP	0.0	69.4	150.4	0.0	34.7
EXHAUST GAS TEMP., DEG.F	501.0	608.0	852.0	1022.0	992.0
SHAFT SPEED, N1, RPM	41760.0	41610.0	41310.0	41210.0	41190.0
COMPRESSOR DSCHG. PRES.,PSIA	48.4	48.1	47.4	42.6	44.5
COMPRESSOR DSCHG. TEMP,DEG F	388.0	388.0	398.0	354.0	358.0
EXHAUST GAS PRESS., PSIA	13.75	13.80	13.88	13.88	13.88
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.430	2.016
COMPRESSOR MAP FLOW,LB/SEC	4.63	4.27	3.95	5.89	5.01
FA RATIO BASED ON MAP FLOW	.0068	.0094	.0141	.0189	.0176
CORRECTED FUEL FLOW , LB/HR	114.0	144.0	200.0	220.0	220.0
FA RATIO CALC. FROM EMISSION	.0067	.0087	.0123	.0166	.0160
EQUIVALENCE RATIO	.098	.128	.187	.244	.234
LOADING W/P**N/V/E(T/540)	.436	.406	.378	.405	.399
COMB EFFIC FROM EMISSIONS	97.589	98.455	99.543	99.634	99.369

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.35	1.77	2.66	3.48	3.33
LB. CO2 PER LB. OF FUEL	3.04	3.07	3.13	3.13	3.12
WEIGHT FLOW, LB./HR.	346.6	442.4	625.2	688.8	685.4
CARBON MONOXIDE					
PPM BY VOLUME, WET	317.1	362.2	222.8	244.7	388.0
LB. PER 1000 LB. OF FUEL	45.554	39.939	16.659	14.883	22.643
WEIGHT FLOW, LB./HR.	5.193	5.751	3.332	3.081	4.982
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	186.0	189.5	17.4	12.6	33.8
LB. PER 1000 LB. OF FUEL	15.272	6.981	.744	.412	1.124
WEIGHT FLOW, LB./HR.	1.741	.994	.149	.091	.247
RATIO LB HC/LB CO	.3352	.1728	.0446	.0294	.0496
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	11.5	16.0	37.0	51.5	44.0
LB. PER 1000 LB. OF FUEL	2.714	3.260	4.545	4.841	4.387
WEIGHT FLOW, LB./HR.	.309	.469	.909	1.065	.968
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.8	3.8	1.0	0.0	.5
LB. PER 1000 LB. OF FUEL	.897	.686	.123	0.000	.049
WEIGHT FLOW, LB./HR.	.102	.099	.025	0.000	.011
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.3	21.8	38.0	51.5	44.5
LB. PER 1000 LB. OF FUEL	3.610	3.948	4.668	4.841	4.356
WEIGHT FLOW, LB./HR.	.412	.569	.934	1.065	.958
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00703	.00700	.00700	.00701	.00701
SMOKE NUMBER	16.90	18.10	15.70	23.50	22.90
CORRECTED WEIGHT FLOW	.02108	.02101	.02101	.02104	.02104
SMOKE NUMBER	32.50	32.50	24.70	36.10	44.80
CORRECTED WEIGHT FLOW	.03508	.03501	.03508	.03507	.03506
SMOKE NUMBER	37.30	41.80	33.70	45.80	54.20
CORRECTED WEIGHT FLOW	.04911	.04902	.04909	.04908	.04908
SMOKE NUMBER	44.60	47.00	38.60	58.40	60.20
SMOKE NUMBER AT HA=0.023	33.10	35.80	28.50	41.40	45.80

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 22.83

DATA POINT NUMBER	186	187	188	189	190
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.193	5.751	3.332	3.881	4.982
UNBURNED HYDROCARBONS	1.741	.994	.149	.891	.247
OXIDES OF NITROGEN	.412	.569	.434	1.065	.958
NITRIC OXIDE	.389	.469	.539	1.065	.948
POWER LEVEL HP	0.00	60.42	150.44	201.48	203.66
TOTAL CORRECTED HORSEPOWER	0.00	79.34	196.97	264.38	266.91
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	95.189	22.147	15.298	24.468
UNBURNED HYDROCARBONS	0.000	16.447	.989	.458	1.214
OXIDES OF NITROGEN	0.000	9.410	6.285	5.287	4.705
NITRIC OXIDE	0.000	7.778	6.042	5.287	4.652

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	1.324	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	28.487	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.597	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CJ IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 13 DATE: 6-19-75 TIME: 15.3 BARO. PRESS.: 22.830 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 78.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	191	192	193	194	195
POWER SETTING, CORRECTED HP.	0.00	79.11	196.74	0.00	45.53
N1 SPEED, RPM	41770.00	41610.00	41300.00	41210.00	41170.00
FUEL FLOW (MEAS.) LB./HR.	115.00	145.00	200.00	218.00	220.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	4.92	4.63	4.29	5.49	5.38
COMPRESSOR INLET TEMP., DEG. F	58.0	60.0	61.0	59.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	48.71	47.87	47.38	42.52	44.34
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	384.00	389.00	398.00	352.00	357.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.85	1.54
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	41.34	43.40
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	377.00	381.00
ENGINE EXHAUST GAS TEMP., DEG. F	488.0	610.0	857.0	1022.0	987.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	183.000	105.000	16.500	12.300	36.000
CARBON MONOXIDE (CO), PPMV	314.403	356.426	222.787	249.616	442.773
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	21.000	38.000	51.000	43.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.306	1.773	2.698	3.482	3.389
NITRIC OXIDE (NO), PPMV	12.600	18.100	37.000	51.000	43.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	15.486	6.621	.696	.402	1.238
CARBON MONOXIDE (CO)	46.547	39.321	16.431	14.284	26.477
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.648	3.950	4.603	4.794	4.278
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.781	.960	.139	.088	.271
CARBON MONOXIDE (CO)	5.353	5.702	3.286	3.114	5.825
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.419	.573	.921	1.045	.948
ENGINE WORK OUTPUT, MEAS. SHP	0.00	60.42	150.41	0.00	34.71
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	200.28	169.76
ENGINE WORK OUTPUT, TOTAL HP	0.00	60.42	150.41	200.28	204.47
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.55	98.49	99.55	99.63	99.27
F/A (EMISSIONS)	.006	.009	.013	.017	.016

**********AIRESEARCH EMISSION TEST SUMMARY**********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 22.43
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	191	192	193	194	195
PERCENT MAX. CORRECTED POWER	0.0	39.6	98.4	0.0	22.6
CORRECTED SHAFT HP	0.0	79.1	196.7	0.0	45.5
MEASURED SHAFT HP	0.0	60.4	150.4	0.0	34.7
EXHAUST GAS TEMP., DEG.F	488.0	610.0	857.0	1022.0	987.0
SHAFT SPEED, N1, RPM	41770.0	41610.0	41300.0	41210.0	41170.0
COMPRESSOR DSCHG. PRES.,PSIA	48.7	47.9	47.4	42.5	44.3
COMPRESSOR DSCHG. TEMP,DEG F	384.0	389.0	398.0	352.0	357.0
EXHAUST GAS PRESS., PSIA	13.75	13.79	13.90	13.89	13.89
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.421	2.016
COMPRESSOR MAP FLOW,LB/SEC	4.58	4.42	3.95	5.09	4.97
FA RATIO BASED ON MAP FLOW	.0070	.0091	.0141	.0187	.0178
CORRECTED FUEL FLOW , LB/HR	115.0	145.0	200.0	218.0	220.0
FA RATIO CALC. FROM EMISSION	.0065	.0087	.0129	.0166	.0159
EQUIVALENCE RATIO	.095	.127	.198	.244	.233
LOADING W/P**N/V/E(T/540)	.428	.423	.378	.488	.398
COMB EFFIC FROM EMISSIONS	97.547	98.494	99.552	99.629	99.269

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.77	2.78	3.48	3.31
LB. CO2 PER LB. OF FUEL	3.04	3.07	3.13	3.13	3.11
WEIGHT FLOW, LB./HR.	349.4	445.7	625.3	682.5	684.8
CARBON MONOXIDE					
PPM BY VOLUME, WET	314.4	356.4	222.8	249.6	442.8
LB. PER 1000 LB. OF FUEL	46.547	39.321	16.431	14.284	26.477
WEIGHT FLOW, LB./HR.	5.353	5.702	3.286	3.114	5.825
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	183.0	105.0	16.5	12.3	36.0
LB. PER 1000 LB. OF FUEL	15.486	6.621	.696	.402	1.238
WEIGHT FLOW, LB./HR.	1.781	.960	.139	.088	.271
RATIO LB HC/LB CO	.3327	.1684	.0423	.0282	.0465
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	12.8	18.1	37.8	51.8	43.8
LB. PER 1000 LB. OF FUEL	3.113	3.288	4.482	4.794	4.224
WEIGHT FLOW, LB./HR.	.358	.476	.896	1.045	.929
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.2	3.7	1.0	0.0	.5
LB. PER 1000 LB. OF FUEL	.535	.678	.121	0.000	.049
WEIGHT FLOW, LB./HR.	.062	.097	.024	0.000	.011
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.0	21.8	38.8	51.8	43.5
LB. PER 1000 LB. OF FUEL	3.648	3.950	4.603	4.794	4.273
WEIGHT FLOW, LB./HR.	.419	.573	.921	1.045	.940
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00702	.00702	.00702	.00702	.00701
SMOKE NUMBER	15.70	18.10	14.50	21.70	24.10
CORRECTED WEIGHT FLOW	.02105	.02105	.02105	.02105	.02104
SMOKE NUMBER	30.10	31.30	25.30	36.70	43.40
CORRECTED WEIGHT FLOW	.03501	.03501	.03501	.03500	.03507
SMOKE NUMBER	39.00	39.60	32.50	47.60	50.60
CORRECTED WEIGHT FLOW	.04902	.04902	.04911	.04909	.04917
SMOKE NUMBER	44.60	47.00	41.00	53.00	59.00
SMOKE NUMBER AT WA=8.023	32.40	34.40	28.60	40.10	44.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 22.83

DATA POINT NUMBER	191	192	193	194	195
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.353	5.782	3.286	3.114	5.025
UNBURNED HYDROCARBONS	1.781	.960	.139	.088	.271
OXIDES OF NITROGEN	.419	.573	.921	1.045	.948
NITRIC OXIDE	.358	.476	.896	1.045	.929
POWER LEVEL HP	0.00	60.42	150.41	200.28	284.47
TOTAL CORRECTED HORSEPOWER	0.00	79.11	196.74	262.48	267.88
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	94.367	21.848	15.547	28.487
UNBURNED HYDROCARBONS	0.000	15.890	.925	.438	1.324
OXIDES OF NITROGEN	0.000	9.481	6.121	5.218	4.597
NITRIC OXIDE	0.000	7.872	5.960	5.218	4.544

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LAGG2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36173 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.790	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	20.875	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.812	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 14 DATE: 6-19-75 TIME: 8.30 BARO. PRESS.: 25.980 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	196	197	198	199	200
POWER SETTING, CORRECTED HP.	0.00	79.24	198.36	0.00	45.53
N1 SPEED, RPM	41720.00	41750.00	41240.00	41170.00	41130.00
FUEL FLOW (MEAS.) LB./HR.	132.00	162.00	226.00	242.00	250.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.53	5.22	4.90	6.27	6.14
COMPRESSOR INLET TEMP., DEG. F	61.0	61.0	60.0	61.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	55.48	54.75	54.01	48.85	50.72
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	386.00	391.00	396.00	354.00	355.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.98	1.74
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	47.77	49.35
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	376.00	377.00
ENGINE EXHAUST GAS TEMP., DEG. F	468.0	609.0	839.0	972.0	981.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	154.500	88.500	15.000	19.500	21.000
CARBON MONOXIDE (CO), PPMV	273.806	306.306	199.101	342.121	317.124
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	21.500	39.000	44.500	44.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.343	1.765	2.698	3.267	3.297
NITRIC OXIDE (NO), PPMV	13.000	20.000	38.000	43.500	44.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	12.791	5.629	.633	.677	.723
CARBON MONOXIDE (CO)	39.661	34.082	14.697	20.793	19.113
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.569	3.930	4.729	4.443	4.485
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.688	.912	.144	.164	.181
CARBON MONOXIDE (CO)	5.235	5.521	3.351	5.032	4.778
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.471	.637	1.078	1.075	1.181
ENGINE WORK OUTPUT, MEAS. SHP	0.00	68.93	172.40	0.00	39.49
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	212.96	189.39
ENGINE WORK OUTPUT, TOTAL HP	0.00	68.93	172.40	212.96	228.89
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.94	98.70	99.60	99.45	99.49
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 25.98
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007508
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.8 FLO,L/M= 14.168 SL TIM,S= 6.5888

DATA POINT NUMBER	196	197	198	199	200
PERCENT MAX. CORRECTED POWER	0.0	39.6	99.2	0.0	22.0
CORRECTED SHAFT HP	0.0	79.2	198.4	0.0	45.5
MEASURED SHAFT HP	0.0	68.9	172.4	0.0	39.5
EXHAUST GAS TEMP., DEG.F	488.0	689.0	839.0	972.0	981.0
SHAFT SPEED, N1, RPM	41720.0	41750.0	41240.0	41170.0	41130.0
COMPRESSOR DSCHG. PRES.,PSIA	55.5	54.7	54.0	48.9	50.7
COMPRESSOR DSCHG. TEMP,DEG F	386.0	391.0	396.0	354.0	355.0
EXHAUST GAS PRESS., PSIA	13.64	13.71	13.81	13.81	13.80
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.288	2.003
COMPRESSOR MAP FLOW,LB/SEC	5.23	4.93	4.47	5.85	5.70
FA RATIO BASED ON MAP FLOW	.0070	.0091	.0142	.0174	.0175
CORRECTED FUEL FLOW , LB/HR	132.0	162.0	228.0	242.0	250.0
FA RATIO CALC. FROM EMISSION	.0066	.0086	.0129	.0157	.0158
EQUIVALENCE RATIO	.097	.126	.190	.230	.232
LOADING H/P**N/V/E(T/540)	.388	.371	.342	.361	.365
COMB EFFIC FROM EMISSIONS	97.945	98.785	99.599	99.451	99.487

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.34	1.76	2.78	3.27	3.38
LB. CO2 PER LB. OF FUEL	3.06	3.09	3.13	3.12	3.12
WEIGHT FLOW, LB./HR.	403.5	499.8	713.5	754.9	780.5
CARBON MONOXIDE					
PPM BY VOLUME, WET	273.8	306.3	199.1	342.1	317.1
LB. PER 1000 LB. OF FUEL	39.661	34.082	14.697	20.793	19.113
WEIGHT FLOW, LB./HR.	5.235	5.521	3.351	5.032	4.778
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	154.5	88.5	15.8	19.5	21.0
LB. PER 1000 LB. OF FUEL	12.791	5.629	.633	.677	.723
WEIGHT FLOW, LB./HR.	1.688	.912	.144	.164	.181
RATIO LB HC/LB CO	.3225	.1651	.0431	.0326	.0379
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.0	20.0	38.0	43.5	44.0
LB. PER 1000 LB. OF FUEL	3.093	3.655	4.688	4.343	4.356
WEIGHT FLOW, LB./HR.	.408	.592	1.051	1.051	1.089
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.0	1.5	1.0	1.0	.5
LB. PER 1000 LB. OF FUEL	.476	.274	.121	.108	.049
WEIGHT FLOW, LB./HR.	.063	.044	.028	.024	.012
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.0	21.5	39.0	44.5	44.5
LB. PER 1000 LB. OF FUEL	3.569	3.930	4.729	4.443	4.405
WEIGHT FLOW, LB./HR.	.471	.637	1.078	1.075	1.101
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00712	.00709	.00707	.00707	.00707
SMOKE NUMBER	16.30	17.50	13.30	20.50	19.30
CORRECTED WEIGHT FLOW	.02136	.02126	.02121	.02121	.02121
SMOKE NUMBER	27.70	34.90	26.50	39.80	38.60
CORRECTED WEIGHT FLOW	.03558	.03542	.03535	.03535	.03534
SMOKE NUMBER	41.00	41.60	31.90	50.00	47.60
CORRECTED WEIGHT FLOW	.04980	.04959	.04947	.04947	.04946
SMOKE NUMBER	43.40	49.40	41.00	55.40	54.20
SMOKE NUMBER AT WA=0.023	32.20	36.10	28.40	41.70	40.20

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

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AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COM3 P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 25.98

DATA POINT NUMBER	196	197	198	199	200
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.235	5.521	3.351	5.032	4.778
UNBURNED HYDROCARBONS	1.688	.912	.144	.164	.181
OXIDES OF NITROGEN	.471	.637	1.078	1.075	1.101
NITRIC OXIDE	.408	.592	1.051	1.051	1.089
POWER LEVEL HP	0.00	66.93	172.40	212.96	228.89
TOTAL CORRECTED HORSEPOWER	0.00	79.24	198.36	245.72	263.43
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	80.097	19.437	23.629	20.875
UNBURNED HYDROCARBONS	0.000	13.228	.837	.778	.790
OXIDES OF NITROGEN	0.000	9.235	6.254	5.048	4.812
NITRIC OXIDE	0.000	8.591	6.094	4.935	4.758

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N138 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36173 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.863	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	21.654	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.851	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 14 DATE: 6-19-75 TIME: 9.45 BARO. PRESS.: 25.980 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	201	202	203	204	205
POWER SETTING, CORRECTED HP.	0.00	78.86	198.40	0.00	45.36
N1 SPEED, RPM	41740.00	41550.00	41250.00	41440.00	41100.00
FUEL FLOW (MEAS.) LB./HR.	130.00	163.00	228.00	242.00	250.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.55	5.24	4.88	6.29	6.22
COMPRESSOR INLET TEMP., DEG. F	59.0	61.0	60.0	58.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	55.73	54.70	53.86	48.85	50.33
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	384.00	389.00	394.00	352.00	358.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.99	1.74
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	47.87	49.69
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	374.00	379.00
ENGINE EXHAUST GAS TEMP., DEG. F	490.0	618.0	852.0	975.0	978.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	154.500	88.500	15.900	21.000	22.500
CARBON MONOXIDE (CO), PPMV	279.983	306.306	206.143	347.806	322.598
TOTAL OXIDES OF NITROGEN (NOX), PPMV	14.800	20.500	37.000	43.500	44.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.314	1.769	2.709	3.255	3.237
NITRIC OXIDE (NO), PPMV	14.500	19.000	36.000	42.500	43.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	13.056	5.615	.668	.732	.789
CARBON MONOXIDE (CO)	41.393	33.999	15.153	21.211	19.796
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.594	3.738	4.468	4.358	4.435
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.697	.915	.152	.177	.197
CARBON MONOXIDE (CO)	5.381	5.542	3.455	5.133	4.949
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.467	.609	1.019	1.055	1.109
ENGINE WORK OUTPUT, MEAS. SHP	0.00	68.60	172.44	0.00	39.46
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	214.14	189.09
ENGINE WORK OUTPUT, TOTAL HP	0.00	68.60	172.44	214.14	228.55
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.88	98.71	99.58	99.44	99.47
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 25.98
RAT SHP= 288. RA EGT,F= 1150. RAT SPD= 41688. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18478. S AIR T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	281	282	283	284	285
PERCENT MAX. CORRECTED POWER	0.0	39.4	99.2	0.0	22.7
CORRECTED SHAFT HP	0.0	78.9	198.4	0.0	45.4
MEASURED SHAFT HP	0.0	68.6	172.4	0.0	39.5
EXHAUST GAS TEMP., DEG.F	490.0	619.0	852.0	975.0	978.0
SHAFT SPEED, N1, RPM	41740.0	41550.0	41250.0	41440.0	41100.0
COMPRESSOR DSCHG. PRES.,PSIA	55.7	54.7	53.9	48.9	50.3
COMPRESSOR DSCHG. TEMP,DEG F	384.0	389.0	394.0	352.0	358.0
EXHAUST GAS PRESS., PSIA	13.64	13.78	13.81	13.81	13.81
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.286	2.812
COMPRESSOR MAP FLOW,LB/SEC	5.27	5.01	4.49	5.85	5.70
FA RATIO BASED ON MAP FLOW	.0069	.0098	.0141	.0174	.0175
CORRECTED FUEL FLOW , LB/HR	130.0	183.0	228.0	242.0	250.0
FA RATIO CALC. FROM EMISSION	.0065	.0086	.0130	.0156	.0155
EQUIVALENCE RATIO	.395	.127	.190	.229	.228
LOADING W/P**N/V/E(T/540)	.398	.388	.346	.382	.367
COMB EFFIC FROM EMISSIONS	97.881	98.708	99.585	99.437	99.465

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.31	1.77	2.71	3.25	3.24
LB. CO2 PER LB. OF FUEL	3.05	3.09	3.13	3.12	3.12
WEIGHT FLOW, LB./HR.	396.9	572.9	713.3	754.7	780.2
CARBON MONOXIDE					
PPM BY VOLUME, WET	288.0	386.3	286.1	347.8	322.6
LB. PER 1000 LB. OF FUEL	41.393	33.939	15.153	21.211	19.796
WEIGHT FLOW, LB./HR.	5.381	5.542	3.455	5.133	4.949
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	154.5	86.5	15.9	21.8	22.5
LB. PER 1000 LB. OF FUEL	13.056	5.015	.668	.732	.789
WEIGHT FLOW, LB./HR.	1.697	.915	.152	.177	.197
RATIO LB HC/LB CO	.3154	.1651	.0441	.0345	.0399
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	14.5	19.8	36.8	42.5	43.5
LB. PER 1000 LB. OF FUEL	3.521	3.464	4.347	4.257	4.385
WEIGHT FLOW, LB./HR.	.458	.565	.991	1.038	1.096
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	.3	1.5	1.8	1.8	.5
LB. PER 1000 LB. OF FUEL	.073	.273	.121	.180	.050
WEIGHT FLOW, LB./HR.	.009	.049	.028	.024	.013
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	14.8	28.5	37.8	43.5	44.8
LB. PER 1000 LB. OF FUEL	3.594	3.738	4.468	4.356	4.435
WEIGHT FLOW, LB./HR.	.467	.609	1.019	1.055	1.109
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00736	.00705	.00703	.00703	.00704
SMOKE NUMBER	19.70	16.98	13.38	22.98	22.38
CORRECTED WEIGHT FLOW	.02118	.02114	.02109	.02109	.02113
SMOKE NUMBER	38.18	34.98	26.98	42.28	39.88
CORRECTED WEIGHT FLOW	.03530	.03522	.03514	.03513	.03520
SMOKE NUMBER	56.88	44.68	37.38	51.88	50.68
CORRECTED WEIGHT FLOW	.04941	.04929	.04929	.04919	.04928
SMOKE NUMBER	48.68	58.68	19.88	60.28	57.28
SMOKE NUMBER AT WA=0.023	33.48	37.18	30.18	44.78	42.88

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-79 FUEL=AV. KERO. P BARO= 25.98

DATA POINT NUMBER	201	202	203	204	205
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.381	5.542	3.455	5.133	4.949
UNBURNED HYDROCARBONS	1.697	.919	.152	.177	.197
OXIDES OF NITROGEN	.467	.689	1.819	1.855	1.189
NITRIC OXIDE	.458	.565	.991	1.038	1.096
POWER LEVEL HP	0.00	68.60	172.44	214.14	228.55
TOTAL CORRECTED HORSEPOWER	0.00	78.86	198.48	246.38	263.54
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	80.761	20.035	23.970	21.654
UNBURNED HYDROCARBONS	0.000	13.341	.883	.827	.863
OXIDES OF NITROGEN	0.000	8.861	5.987	4.925	4.851
NITRIC OXIDE	0.000	8.231	5.747	4.811	4.796

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LAGC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 289. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.721	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	28.503	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.758	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

********** OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 14 DATE: 6-19-75 TIME: 10.45 BARO. PRESS.: 25.988 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	206	207	208	209	210
POWER SETTING, CORRECTED HP.	0.00	78.99	198.35	0.00	45.47
N1 SPEED, RPM	41718.00	41540.00	41268.00	41128.00	41060.00
FUEL FLOW (MEAS.) LB./HR.	138.00	164.00	226.00	242.00	250.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.43	5.26	4.90	6.16	6.07
COMPRESSOR INLET TEMP., DEG. F	60.0	59.0	59.0	61.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	55.73	54.60	53.86	48.61	50.43
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	384.00	380.00	394.00	354.00	355.00
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	1.99	1.75
BLEED AIR TEMPERATURE, DEG. F	0.00	0.00	0.00	47.63	49.44
ENGINE EXHAUST GAS TEMP., DEG. F	-0.00	-0.00	-0.00	376.00	376.00
EMISSION CONCENTRATION, WET ANALYSIS	493.0	610.0	853.0	983.0	983.0
HYDROCARBON (HC AS CH4), PPMC	150.000	68.500	15.600	19.500	19.500
CARBON MONOXIDE (CO), PPMV	274.634	386.386	203.790	333.684	317.124
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.000	21.300	38.200	45.000	44.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.347	1.773	2.696	3.356	3.356
NITRIC OXIDE (NO), PPMV	15.000	19.000	38.000	44.000	44.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	12.385	5.681	.698	.659	.668
CARBON MONOXIDE (CO)	39.781	33.916	15.841	19.741	18.778
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.599	3.674	4.631	4.373	4.356
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.618	.919	.158	.160	.169
CARBON MONOXIDE (CO)	5.161	9.562	3.429	4.777	4.693
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.463	.635	1.056	1.058	1.089
ENGINE WORK OUTPUT, MEAS. SHP	0.00	60.59	172.23	0.00	39.45
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	213.34	189.42
ENGINE WORK OUTPUT, TOTAL HP	0.00	60.59	172.23	213.34	228.87
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.98	98.71	99.59	99.48	99.58
F/A (EMISSIONS)	.887	.889	.813	.816	.816

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 25.98
RAT SHP= 209. RA EGT,F= 1158. RAT SPD= 41688. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007588
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO.L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	206	207	208	209	210
PERCENT MAX. CORRECTED POWER	0.0	39.5	99.2	0.0	22.7
CORRECTED SHAFT HP	0.0	79.0	198.4	0.0	45.5
MEASURED SHAFT HP	0.0	68.6	172.2	0.0	39.4
EXHAUST GAS TEMP., DEG.F	493.0	610.0	853.0	983.0	983.0
SHAFT SPEED, N1, RPM	41718.0	41548.0	41288.0	41128.0	41088.0
COMPRESSOR DSCHG. PRES.,PSIA	55.7	54.6	53.9	48.6	50.4
COMPRESSOR DSCHG. TEMP.,DEG F	384.0	388.0	394.0	354.0	355.0
EXHAUST GAS PRESS., PSIA	13.64	13.69	13.81	13.81	13.81
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.292	2.010
COMPRESSOR MAP FLOW,LB/SEC	5.27	4.99	4.49	5.77	5.79
FA RATIO BASED ON MAP FLOW	.0069	.0091	.0141	.0178	.0176
CORRECTED FUEL FLOW , LB/HR	130.0	164.0	228.0	242.0	250.0
FA RATIO CALC. FROM EMISSION	.0067	.0087	.0129	.0161	.0161
EQUIVALENCE RATIO	.098	.127	.190	.236	.236
LOADING W/P**N/V/EXT/S40)	.390	.368	.346	.376	.368
COMB EFFIC FROM EMISSIONS	97.988	98.711	99.588	99.478	99.581

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.35	1.77	2.78	3.36	3.36
LB. CO2 PER LB. OF FUEL	3.06	3.09	3.13	3.12	3.12
WEIGHT FLOW, LB./HR.	397.5	506.8	713.3	755.3	780.7
CARBON MONOXIDE					
PPM BY VOLUME, WET	274.8	386.3	283.8	333.7	317.1
LB. PER 1000 LB. OF FUEL	39.731	33.916	15.841	19.741	18.778
WEIGHT FLOW, LB./HR.	5.161	5.562	3.629	4.777	4.693
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	158.0	88.5	15.6	19.5	19.5
LB. PER 1000 LB. OF FUEL	12.385	5.681	.658	.659	.660
WEIGHT FLOW, LB./HR.	1.610	.919	.150	.160	.165
RATIO LB HC/LB CO	.3120	.1651	.0438	.0334	.0351
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	15.0	19.8	38.8	44.0	44.0
LB. PER 1000 LB. OF FUEL	3.559	3.456	4.687	4.276	4.278
WEIGHT FLOW, LB./HR.	.463	.567	1.050	1.035	1.069
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	0.0	2.3	.2	1.8	.8
LB. PER 1000 LB. OF FUEL	0.000	.418	.024	.097	.078
WEIGHT FLOW, LB./HR.	0.000	.069	.006	.024	.019
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.0	21.3	38.2	45.8	44.8
LB. PER 1000 LB. OF FUEL	3.559	3.874	4.631	4.373	4.356
WEIGHT FLOW, LB./HR.	.463	.635	1.056	1.058	1.089
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00786	.00785	.00784	.00784	.00784
SMOKE NUMBER	20.50	18.70	16.90	21.70	19.30
CORRECTED WEIGHT FLOW	.02118	.02113	.02113	.02112	.02112
SMOKE NUMBER	32.50	34.90	31.90	42.20	41.80
CORRECTED WEIGHT FLOW	.03529	.03522	.03521	.03528	.03526
SMOKE NUMBER	42.80	42.20	36.10	51.80	51.80
CORRECTED WEIGHT FLOW	.04941	.04930	.04926	.04928	.04936
SMOKE NUMBER	48.80	47.80	44.80	57.80	60.20
SMOKE NUMBER AT WA=0.023	36.40	36.80	32.50	43.80	43.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 25.98

DATA POINT NUMBER	206	207	208	209	210
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.161	5.562	3.429	4.777	4.693
UNBURNED HYDROCARBONS	1.610	.919	.158	.168	.165
OXIDES OF NITROGEN	.463	.635	1.056	1.056	1.089
NITRIC OXIDE	.463	.567	1.050	1.035	1.069
POWER LEVEL HP	0.00	68.59	172.23	213.34	228.87
TOTAL CORRECTED HORSEPOWER	0.00	78.99	198.35	246.17	263.41
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	61.897	19.918	22.393	20.583
UNBURNED HYDROCARBONS	0.000	13.393	.871	.748	.721
OXIDES OF NITROGEN	0.000	9.263	6.131	4.960	4.758
NITRIC OXIDE	0.000	8.263	6.098	4.850	4.673

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-15-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 280. + BLEED AIR EXTRACTION TO 1158. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.596	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	18.033	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.934	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 15 DATE: 6-15-75 TIME: 13.00 BARO. PRESS.: 28.620 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 388.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	211	212	213	214	215
POWER SETTING, CORRECTED HP.	0.00	79.12	198.68	0.00	45.61
N1 SPEED, RPM	41610.00	41430.00	41070.00	40960.00	40980.00
FUEL FLOW (MEAS.) LB./HR.	141.00	175.00	244.00	261.00	272.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.91	5.54	5.14	6.66	6.61
COMPRESSOR INLET TEMP., DEG. F	59.0	59.0	59.0	60.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.88	59.90	58.92	53.83	54.99
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	378.00	384.00	392.00	349.00	352.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.18	1.95
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.65	53.67
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	370.00	373.00
ENGINE EXHAUST GAS TEMP., DEG. F	490.0	612.0	862.0	1000.0	998.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	124.500	75.000	14.400	13.500	16.500
CARBON MONOXIDE (CO), PPMV	247.140	277.404	198.717	267.179	285.169
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.000	23.200	41.200	49.000	47.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.347	1.800	2.752	3.389	3.389
NITRIC OXIDE (NO), PPMV	14.900	21.000	40.000	47.000	47.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	10.319	4.689	.596	.453	.554
CARBON MONOXIDE (CO)	35.838	38.348	13.809	15.698	16.744
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.811	4.168	4.900	4.729	4.581
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.455	.821	.145	.118	.151
CARBON MONOXIDE (CO)	5.053	6.310	3.369	4.097	4.554
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.537	.729	1.196	1.234	1.246
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.68	189.97	0.00	43.58
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	238.74	208.99
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.68	189.97	238.74	252.57
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.25	98.87	99.62	99.59	99.56
F/A (EMISSIONS)	.007	.009	.013	.016	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-15-75 FUEL=AV. KERO. P BARO= 28.62

RAT SHP= 280. RA EGT,F= 1158. RAT SPD= 41600. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007500

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.0 FLO.L/H= 14.160 SL TIM,S= 6.5800

DATA POINT NUMBER	211	212	213	214	215
PERCENT MAX. CORRECTED POWER	0.0	39.6	99.3	0.0	22.8
CORRECTED SHAFT HP	0.0	79.1	198.6	0.0	45.6
MEASURED SHAFT HP	0.0	75.7	190.8	0.0	43.6
EXHAUST GAS TEMP., DEG.F	490.0	612.0	862.0	1008.0	998.0
SHAFT SPEED, N1, RPM	41610.0	41430.0	41070.0	40960.0	40980.0
COMPRESSOR DSCHG. PRES.,PSIA	60.9	59.9	58.9	53.8	55.8
COMPRESSOR DSCHG. TEMP,DEG F	378.0	384.0	392.0	349.0	352.0
EXHAUST GAS PRESS., PSIA	13.62	13.68	14.30	13.80	13.80
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.264	2.032
COMPRESSOR MAP FLOW,LB/SEC	5.97	5.67	5.88	6.62	6.52
FA RATIO BASED ON MAP FLOW	.0066	.0086	.0134	.0163	.0165
CORRECTED FUEL FLOW , LB/HR	141.0	175.0	244.0	261.0	272.0
FA RATIO CALC. FROM EMISSION	.0066	.0086	.0132	.0162	.0162
EQUIVALENCE RATIO	.097	.129	.193	.237	.238
LOADING W/P**N/V/E((T/540)	.383	.378	.336	.382	.367
COMB EFFIC FROM EMISSIONS	98.252	98.875	99.623	99.591	99.558

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.35	1.80	2.75	3.39	3.39
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	432.8	541.4	763.9	816.4	850.3
CARBON MONOXIDE					
PPM BY VOLUME, WET	247.1	277.4	190.7	267.2	285.2
LB. PER 1000 LB. OF FUEL	35.838	30.348	18.809	19.698	18.744
WEIGHT FLOW, LB./HR.	5.053	5.318	3.369	4.097	4.594
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	124.5	75.8	14.4	13.5	16.5
LB. PER 1000 LB. OF FUEL	18.319	4.689	.596	.453	.554
WEIGHT FLOW, LB./HR.	1.455	.821	.149	.118	.151
RATIO LB HC/LB CO	.2879	.1545	.0432	.0289	.0331
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	14.9	21.8	48.8	47.8	47.6
LB. PER 1000 LB. OF FUEL	3.549	3.773	4.757	4.613	4.583
WEIGHT FLOW, LB./HR.	.500	.660	1.161	1.204	1.233
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	1.1	2.2	1.2	1.2	.5
LB. PER 1000 LB. OF FUEL	.262	.395	.143	.116	.048
WEIGHT FLOW, LB./HR.	.037	.069	.035	.030	.013
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.0	23.2	41.2	49.8	47.5
LB. PER 1000 LB. OF FUEL	3.811	4.168	4.900	4.729	4.581
WEIGHT FLOW, LB./HR.	.537	.729	1.196	1.234	1.246
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08695	.08695	.08694	.08696	.08695
SMOKE NUMBER	24.10	19.90	16.10	24.10	25.30
CORRECTED WEIGHT FLOW	.02884	.02884	.02883	.02886	.02881
SMOKE NUMBER	36.10	34.90	30.10	39.20	43.40
CORRECTED WEIGHT FLOW	.03472	.03472	.03469	.03475	.03467
SMOKE NUMBER	44.60	43.40	39.80	51.80	51.20
CORRECTED WEIGHT FLOW	.04868	.04868	.04856	.04832	.04853
SMOKE NUMBER	49.40	53.60	48.20	57.80	60.20
SMOKE NUMBER AT WA=0.023	39.80	37.70	34.60	43.80	45.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UNC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-15-75 FUEL=AV. KERO. P BARO= 28.62

DATA POINT NUMBER	211	212	213	214	215
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.053	5.318	3.369	4.097	4.554
UNBURNED HYDROCARBONS	1.455	.821	.145	.118	.151
OXIDES OF NITROGEN	.537	.729	1.196	1.234	1.246
NITRIC OXIDE	.538	.668	1.161	1.204	1.233
POWER LEVEL HP	0.00	75.68	189.97	230.74	252.57
TOTAL CORRECTED HORSEPOWER	0.00	79.12	198.60	241.45	263.87
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	70.156	17.737	17.757	18.033
UNBURNED HYDROCARBONS	0.000	10.842	.765	.513	.596
OXIDES OF NITROGEN	0.000	9.638	6.294	5.349	4.934
NITRIC OXIDE	0.000	8.724	6.111	5.218	4.882

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-15-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.592	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	18.223	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.845	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 15 DATE: 6-15-75 TIME: 14.14 BARO. PRESS.: 28.628 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	216	217	218	219	220
POWER SETTING, CORRECTED HP.	0.00	79.04	198.86	8.00	45.54
N1 SPEED, RPM	41600.00	41430.00	41060.00	40930.00	40880.00
FUEL FLOW (MEAS.) LB./HR.	139.00	176.00	244.00	261.00	271.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.83	5.59	5.14	6.56	6.53
COMPRESSOR INLET TEMP., DEG. F	60.0	60.0	60.0	60.0	59.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.64	59.41	58.67	52.78	54.88
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	379.00	386.00	394.00	348.00	351.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.17	1.94
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.31	53.52
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	370.00	371.00
ENGINE EXHAUST GAS TEMP., DEG. F	493.0	615.0	868.0	1087.0	997.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	120.000	75.000	15.000	10.500	16.500
CARBON MONOXIDE (CO), PPMV	244.671	276.375	187.476	239.757	290.393
TOTAL OXIDES OF NITROGEN (NOX), PPMV	15.400	23.000	41.000	50.500	47.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.347	1.796	2.752	3.463	3.432
NITRIC OXIDE (NO), PPMV	13.300	18.000	39.000	49.000	45.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.951	4.780	.621	.345	.547
CARBON MONOXIDE (CO)	35.498	38.383	13.575	13.798	16.835
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.670	4.142	4.877	4.774	4.476
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.383	.827	.151	.090	.148
CARBON MONOXIDE (CO)	4.934	5.333	3.312	3.601	4.562
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.510	.729	1.190	1.246	1.213
ENGINE WORK OUTPUT, MEAS. SHP	0.00	75.68	190.40	8.00	43.56
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	229.83	286.81
ENGINE WORK OUTPUT, TOTAL HP	0.00	75.68	190.40	229.83	250.37
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.29	98.87	99.63	99.65	99.56
F/A (EMISSIONS)	.007	.009	.013	.017	.016

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-15-75 FUEL=AV. KERO. P BARO= 28.62
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. OEN PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9200 STOI F/A= .06622 L H V= 18478. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	216	217	218	219	220
PERCENT MAX. CORRECTED POWER	0.0	39.5	99.4	0.0	22.6
CORRECTED SHAFT HP	0.0	79.0	196.9	0.0	45.5
MEASURED SHAFT HP	0.0	75.7	190.4	0.0	43.6
EXHAUST GAS TEMP., DEG.F	493.0	615.0	868.0	1007.0	997.0
SHAFT SPEED, N1, RPM	41600.0	41430.0	41060.0	40930.0	40880.0
COMPRESSOR DSCHG. PRES.,PSIA	60.6	59.4	58.7	52.8	54.6
COMPRESSOR DSCHG. TEMP,DEG F	379.0	386.0	394.0	348.0	351.0
EXHAUST GAS PRESS., PSIA	13.63	13.66	13.81	13.79	13.80
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.275	2.032
COMPRESSOR MAP FLOW,LB/SEC	5.97	5.58	5.08	6.62	6.52
FA RATIO BASED ON MAP FLOW	.0065	.0088	.0134	.0163	.0165
CORRECTED FUEL FLOW , LB/HR	139.0	176.0	244.0	261.0	271.0
FA RATIO CALC. FROM EMISSION	.0066	.0087	.0132	.0165	.0164
EQUIVALENCE RATIO	.097	.128	.193	.242	.241
LOADING W/P**N/V/E(T/540)	.385	.368	.337	.386	.371
COMB EFFIC FROM EMISSIONS	98.232	98.875	99.626	99.645	99.556

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.35	1.80	2.75	3.46	3.43
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	426.9	544.9	764.8	817.3	847.2
CARBON MONOXIDE					
PPM BY VOLUME, WET	244.7	276.4	187.5	239.8	298.4
LB. PER 1000 LB. OF FUEL	35.498	30.303	13.575	13.798	16.835
WEIGHT FLOW, LB./HR.	4.934	5.333	3.312	3.601	4.562
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	120.0	75.0	15.0	18.5	16.5
LB. PER 1000 LB. OF FUEL	9.951	4.708	.621	.345	.547
WEIGHT FLOW, LB./HR.	1.383	.827	.151	.090	.148
RATIO LB HC/LB CO	.2803	.1551	.0457	.0250	.0325
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.3	18.8	39.0	49.0	45.5
LB. PER 1000 LB. OF FUEL	3.178	3.386	4.639	4.632	4.333
WEIGHT FLOW, LB./HR.	.441	.596	1.132	1.209	1.174
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.1	4.2	2.0	1.5	1.5
LB. PER 1000 LB. OF FUEL	.500	.756	.238	.142	.143
WEIGHT FLOW, LB./HR.	.070	.133	.058	.037	.039
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	15.4	23.0	41.0	50.5	47.0
LB. PER 1000 LB. OF FUEL	3.670	4.142	4.877	4.774	4.476
WEIGHT FLOW, LB./HR.	.510	.729	1.190	1.246	1.213
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.08695	.08693	.08694	.08694	.08693
SMOKE NUMBER	17.50	19.30	16.30	22.30	26.50
CORRECTED WEIGHT FLOW	.02884	.02880	.02878	.02882	.02879
SMOKE NUMBER	34.90	33.70	30.10	42.20	42.80
CORRECTED WEIGHT FLOW	.03472	.03469	.03463	.03469	.03463
SMOKE NUMBER	42.20	43.40	36.10	52.40	53.00
CORRECTED WEIGHT FLOW	.04858	.04851	.04846	.04853	.04844
SMOKE NUMBER	48.20	50.60	44.60	59.60	60.20
SMOKE NUMBER AT WA=0.023	36.20	37.30	32.30	44.80	46.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

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*********************************************  AIRESEARCH EMISSION TEST SUMMARY  ***********************************************
  ENGINE= GTCP85-98CK      S/N= 36179     COMB P/N= 698168-3 TEST DATE  6-15-75      FUEL=AV. KERO.    P BARO= 28.62
DATA POINT NUMBER                  216       217       218       219       220
EMISSION RATE LB/HR
    CARBON MONOXIDE               4.934     5.333     3.312     3.601     4.562
    UNBURNED HYDROCARBONS         1.383      .827      .151      .090      .148
    OXIDES OF NITROGEN             .510      .729     1.190     1.246     1.213
    NITRIC OXIDE                   .441      .596     1.132     1.209     1.174
POWER LEVEL HP                    0.00     75.68    190.40    229.83    250.37
TOTAL CORRECTED HORSEPOWER        0.00     79.04    198.86    240.50    261.74
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR
    CARBON MONOXIDE               0.000    70.470    17.397    15.669    18.223
    UNBURNED HYDROCARBONS         0.000    10.931      .796      .392      .592
    OXIDES OF NITROGEN            0.000     9.633     6.250     5.421     4.845
    NITRIC OXIDE                  0.000     7.874     5.945     5.260     4.690
    NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION
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ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG 138 N136 CALC. DATE: 6-15-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	.597	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	16.388	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.589	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 15 DATE: 6-15-75 TIME: 15:47 BARO. PRESS.: 28.620 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.58 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	221	222	223	224	225
POWER SETTING, CORRECTED HP.	0.00	79.68	199.78	0.00	45.99
N1 SPEED, RPM	41600.00	41420.00	41050.00	40928.00	40870.00
FUEL FLOW (MEAS.) LB./HR.	139.00	178.00	244.00	261.00	278.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	5.83	5.74	5.14	6.62	6.60
COMPRESSOR INLET TEMP., DEG. F	60.0	58.0	58.0	58.0	60.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	60.54	59.56	58.67	52.78	54.75
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	380.00	384.00	393.00	347.00	352.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	2.16	1.95
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	51.31	53.52
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	369.00	373.00
ENGINE EXHAUST GAS TEMP., DEG. F	492.0	615.0	868.0	1000.0	998.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	118.500	72.000	11.400	11.700	16.500
CARBON MONOXIDE (CO), PPMV	245.658	276.375	167.476	269.721	290.393
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.000	23.000	41.500	48.500	47.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.347	1.769	2.752	3.413	3.370
NITRIC OXIDE (NO), PPMV	13.200	18.500	39.000	47.300	44.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	9.827	4.580	.472	.390	.557
CARBON MONOXIDE (CO)	35.642	30.756	13.577	15.733	17.141
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.813	4.204	4.937	4.647	4.557
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.366	.815	.115	.102	.156
CARBON MONOXIDE (CO)	4.954	5.475	3.313	4.106	4.628
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.530	.748	1.205	1.213	1.230
ENGINE WORK OUTPUT, MEAS. SHP	0.00	76.15	190.84	0.00	44.03
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	230.84	207.66
ENGINE WORK OUTPUT, TOTAL HP	0.00	76.15	190.84	230.84	251.69
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.30	98.87	99.64	99.68	99.55
F/A (EMISSIONS)	.007	.009	.013	.016	.016

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-15-75 FUEL=AV. KERO. P BARO= 28.62
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9260 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	221	222	223	224	225
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.8	0.0	23.8
CORRECTED SHAFT HP	0.0	79.7	199.7	0.0	46.8
MEASURED SHAFT HP	0.0	76.1	190.8	0.0	44.8
EXHAUST GAS TEMP., DEG.F	492.0	615.0	968.0	1000.0	998.0
SHAFT SPEED, N1, RPM	41600.0	41420.0	41050.0	40928.8	40870.8
COMPRESSOR DSCHG. PRES.,PSIA	60.5	59.6	58.7	52.4	54.7
COMPRESSOR DSCHG. TEMP,DEG F	380.0	384.0	393.0	347.0	352.0
EXHAUST GAS PRESS., PSIA	13.63	13.69	13.82	13.80	13.80
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.273	2.036
COMPRESSOR MAP FLOW,LB/SEC	5.97	5.58	5.03	6.62	6.49
FA RATIO BASED ON MAP FLOW	.0065	.0089	.0135	.0163	.0165
CORRECTED FUEL FLOW , LB/HR	139.0	178.0	244.0	261.0	270.0
FA RATIO CALC. FROM EMISSION	.0066	.0086	.0132	.0163	.0161
EQUIVALENCE RATIO	.097	.126	.193	.239	.236
LOADING W/P**N/V/E(T/540)	.385	.367	.334	.387	.368
COMB EFFIC FROM EMISSIONS	98.300	98.875	99.639	99.596	99.548

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.35	1.77	2.75	3.41	3.37
LB. CO2 PER LB. OF FUEL	3.07	3.09	3.13	3.13	3.13
WEIGHT FLOW, LB./HR.	426.9	550.6	764.1	816.5	843.9
CARBON MONOXIDE					
PPM BY VOLUME, WET	245.7	276.4	187.5	269.7	290.4
LB. PER 1000 LB. OF FUEL	35.642	30.756	13.577	15.733	17.141
WEIGHT FLOW, LB./HR.	4.954	5.475	3.313	4.106	4.628
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	118.5	72.8	11.4	11.7	16.5
LB. PER 1000 LB. OF FUEL	9.827	4.580	.472	.390	.557
WEIGHT FLOW, LB./HR.	1.366	.815	.115	.102	.150
RATIO LB HC/LB CO	.2757	.1489	.0348	.0248	.0325
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	13.2	18.5	39.0	47.3	44.5
LB. PER 1000 LB. OF FUEL	3.146	3.382	4.639	4.532	4.315
WEIGHT FLOW, LB./HR.	.437	.602	1.132	1.183	1.165
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.8	4.5	2.5	1.2	2.5
LB. PER 1000 LB. OF FUEL	.667	.823	.297	.115	.242
WEIGHT FLOW, LB./HR.	.093	.146	.073	.030	.065
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	16.0	23.0	41.5	48.5	47.0
LB. PER 1000 LB. OF FUEL	3.813	4.204	4.937	4.647	4.557
WEIGHT FLOW, LB./HR.	.530	.748	1.205	1.213	1.230
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00693	.00692	.00692	.00692	.00691
SMOKE NUMBER	18.10	20.50	15.78	20.58	24.10
CORRECTED WEIGHT FLOW	.02076	.02076	.02075	.02074	.02074
SMOKE NUMBER	34.90	36.10	26.38	41.80	43.48
CORRECTED WEIGHT FLOW	.03460	.03459	.03457	.03455	.03462
SMOKE NUMBER	42.20	43.40	38.88	53.88	55.48
CORRECTED WEIGHT FLOW	.04842	.04840	.04839	.04835	.04844
SMOKE NUMBER	51.88	49.48	45.88	59.68	61.48
SMOKE NUMBER AT WA=0.823	37.48	37.98	32.58	44.38	46.88

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-15-75 FUEL=AV. KERO. P BARO= 28.62

DATA POINT NUMBER	221	222	223	224	225
EMISSION RATE LB/HR					
CARBON MONOXIDE	4.954	5.475	3.313	4.186	4.628
UNBURNED HYDROCARBONS	1.366	.815	.115	.102	.158
OXIDES OF NITROGEN	.538	.748	1.285	1.213	1.230
NITRIC OXIDE	.437	.602	1.132	1.183	1.165
POWER LEVEL HP	0.00	76.15	190.84	230.84	251.69
TOTAL CORRECTED HORSEPOWER	0.00	79.68	199.70	241.09	263.29
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	71.892	17.360	17.769	18.388
UNBURNED HYDROCARBONS	0.000	10.705	.603	.441	.597
OXIDES OF NITROGEN	0.000	9.828	6.312	5.254	4.889
NITRIC OXIDE	0.000	7.905	5.932	5.124	4.629

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 1
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
ATOMIC H/C RATIO: 1.926 LHV: 18470. BTU/LB. ADDITIVES: NONE

FUEL: ASTM D1655-73

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********

********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	2.011	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	34.498	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.307	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********

COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
MODEL NO.: USER:

AIRCRAFT INSTALLATION *** MFR.:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 16 DATE: 6-19-75 TIME: BARO. PRESS.: 19.698 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	226	227	228	229	230
POWER SETTING, CORRECTED HP.	0.00	79.75	198.99	0.00	46.14
N1 SPEED, RPM	41840.00	41730.00	41400.00	41400.00	41420.00
FUEL FLOW (MEAS.) LB./HR.	100.00	123.00	178.00	198.00	198.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	4.19	3.93	3.69	4.83	4.75
COMPRESSOR INLET TEMP., DEG. F	61.0	59.0	59.0	59.0	59.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	42.82	41.78	41.19	37.22	39.13
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	383.00	391.00	401.00	356.00	362.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.57	1.28
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	36.33	38.35
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	383.00	386.00
ENGINE EXHAUST GAS TEMP., DEG. F	490.0	613.0	857.0	1005.0	947.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	231.000	139.500	21.900	15.000	51.000
CARBON MONOXIDE (CO), PPMV	356.426	413.792	240.625	290.393	499.960
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.500	20.500	36.500	45.000	38.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.327	1.765	2.661	3.389	3.148
NITRIC OXIDE (NO), PPMV	10.590	16.300	33.000	42.000	35.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	19.132	8.795	.935	.583	1.827
CARBON MONOXIDE (CO)	51.646	45.641	18.578	17.849	31.336
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.218	3.714	4.478	4.348	3.912
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.913	1.082	.159	.096	.347
CARBON MONOXIDE (CO)	5.165	5.614	3.197	3.239	5.954
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.321	.457	.761	.825	.743
ENGINE WORK OUTPUT, MEAS. SHP	0.00	52.48	138.95	0.00	38.36
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	173.84	142.22
ENGINE WORK OUTPUT, TOTAL HP	0.00	52.48	138.95	173.84	172.59
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.11	98.15	99.48	99.55	99.18
F/A (EMISSIONS)	.087	.089	.013	.016	.019

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41680. DEW PT,F= 51. FUEL=AV. KERO. P BARO= 19.69
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 REL HUM= 70.00 SPEC HUM= .007508
FLO.L/H= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	226	227	228	229	230
PERCENT MAX. CORRECTED POWER	0.0	39.9	99.5	0.0	23.1
CORRECTED SHAFT HP	0.0	79.7	199.0	0.0	46.1
MEASURED SHAFT HP	0.0	52.5	131.0	0.0	30.4
EXHAUST GAS TEMP., DEG.F	490.0	613.0	857.0	1005.0	947.0
SHAFT SPEED, N1, RPM	41840.0	41730.0	41680.0	41680.0	41420.0
COMPRESSOR DSCHG. PRES.,PSIA	42.8	41.8	41.2	37.2	39.1
COMPRESSOR DSCHG. TEMP.DEG F	383.0	391.0	481.0	356.0	362.0
EXHAUST GAS PRESS., PSIA	9.37	9.43	9.49	9.49	9.50
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.391	1.938
COMPRESSOR MAP FLOW,LB/SEC	4.00	3.73	3.41	4.44	4.32
FA RATIO BASED ON MAP FLOW	.0070	.0092	.0139	.0184	.0173
CORRECTED FUEL FLOW , LB/HR	100.0	123.0	170.0	190.0	190.0
FA RATIO CALC. FROM EMISSION	.0066	.0087	.0126	.0162	.0152
EQUIVALENCE RATIO	.097	.127	.187	.236	.223
LOADING W/P**N/V/E(T/540)	.470	.451	.414	.452	.436
COMB EFFIC FROM EMISSIONS	97.137	98.155	99.481	99.555	99.183

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.33	1.76	2.66	3.39	3.15
LB. CO2 PER LB. OF FUEL	3.02	3.86	3.12	3.13	3.10
WEIGHT FLOW, LB./HR.	302.8	376.2	538.8	593.9	589.0
CARBON MONOXIDE					
PPM BY VOLUME, WET	356.4	413.8	248.6	299.4	588.8
LB. PER 1000 LB. OF FUEL	51.646	45.641	18.578	17.849	31.336
WEIGHT FLOW, LB./HR.	5.165	5.614	3.157	3.239	5.954
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	231.8	139.5	21.9	15.8	51.8
LB. PER 1000 LB. OF FUEL	19.132	8.795	.935	.583	1.827
WEIGHT FLOW, LB./HR.	1.913	1.082	.159	.096	.347
RATIO LB HC/LB CO	.370+	.1927	.0503	.0295	.0583
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	18.5	16.3	33.8	42.8	35.8
LB. PER 1000 LB. OF FUEL	2.499	2.953	4.849	4.858	3.683
WEIGHT FLOW, LB. HR.	.259	.363	.688	.778	.685
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	3.8	4.2	3.5	3.8	3.8
LB. PER 1000 LB. OF FUEL	.714	.761	.429	.289	.389
WEIGHT FLOW, LB./HR.	.071	.094	.073	.055	.059
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	13.5	20.5	36.5	45.8	38.8
LB. PER 1000 LB. OF FUEL	3.213	3.714	4.478	4.348	3.912
WEIGHT FLOW, LB./HR.	.321	.457	.761	.825	.743
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00785	.00787	.00786	.00786	.00786
SMOKE NUMBER	8.40	9.00	4.20	10.20	19.30
CORRECTED WEIGHT FLOW	.02113	.02121	.02119	.02119	.02119
SMOKE NUMBER	28.50	22.90	12.80	27.70	32.50
CORRECTED WEIGHT FLOW	.03521	.03526	.03532	.03532	.03532
SMOKE NUMBER	27.70	28.90	19.90	34.90	46.40
CORRECTED WEIGHT FLOW	.04927	.04936	.04944	.04944	.04944
SMOKE NUMBER	32.50	36.10	25.90	41.60	51.80
SMOKE NUMBER AT WA=0.025	22.90	24.50	15.70	28.90	37.80

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 19.69

DATA POINT NUMBER	226	227	228	229	230
EMISSION RATE LB/HR					
CARBON MONOXIDE	9.165	9.614	3.157	3.239	5.954
UNBURNED HYDROCARBONS	1.913	1.882	.159	.896	.347
OXIDES OF NITROGEN	.321	.457	.761	.829	.743
NITRIC OXIDE	.259	.363	.686	.778	.685
POWER LEVEL HP	0.00	52.46	138.95	173.84	172.59
TOTAL CORRECTED HORSEPOWER	0.00	79.75	198.99	264.16	262.25
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	186.969	24.108	18.634	34.498
UNBURNED HYDROCARBONS	0.000	28.612	1.214	.558	2.011
OXIDES OF NITROGEN	0.000	6.705	5.814	4.743	4.307
NITRIC OXIDE	0.000	6.922	5.256	4.427	3.967

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LACC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-19-79
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 2
MAX SHP 280. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	1.990	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	33.598	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.438	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 16 DATE: 6-19-79 TIME: 18.59 BARO. PRESS.: 19.690 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 380.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	231	232	233	234	235
POWER SETTING, CORRECTED HP.	0.00	79.73	198.89	0.00	46.18
N1 SPEED, RPM	41890.00	41760.00	41500.00	41485.00	41628.00
FUEL FLOW (MEAS.) LB./HR.	102.00	124.00	175.00	198.00	190.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	4.26	3.91	3.72	4.77	4.72
COMPRESSOR INLET TEMP., DEG. F	59.0	60.0	60.0	59.0	58.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	42.47	41.49	41.15	37.22	39.13
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	387.00	394.00	403.00	356.00	361.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.57	1.28
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	36.33	38.30
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	383.00	385.00
ENGINE EXHAUST GAS TEMP., DEG. F	493.0	622.0	864.0	1084.0	949.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	232.500	134.488	21.000	15.000	51.000
CARBON MONOXIDE (CO), PPMV	352.389	413.792	244.671	298.384	492.035
TOTAL OXIDES OF NITROGEN (NOX), PPMV	14.000	20.500	35.500	46.000	39.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.323	1.787	2.719	3.444	3.177
NITRIC OXIDE (NO), PPMV	9.500	16.000	32.500	44.000	36.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	19.317	8.374	.877	.495	1.811
CARBON MONOXIDE (CO)	51.222	45.104	17.886	17.229	38.565
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.343	3.671	4.263	4.364	4.831
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.970	1.038	.154	.894	.344
CARBON MONOXIDE (CO)	5.225	5.593	3.130	3.273	5.887
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.341	.459	.746	.829	.766
ENGINE WORK OUTPUT, MEAS. SHP	0.00	52.52	131.02	0.00	38.36
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	173.53	142.49
ENGINE WORK OUTPUT, TOTAL HP	0.00	52.52	131.02	173.53	172.85
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.18	98.20	99.50	99.55	99.12
F/A (EMISSIONS)	.087	.089	.013	.016	.015

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 19.69
RAT SHP= 288. RA EGT,F= 1150. RAT SPD= 41688. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007508
FUEL H/C= 1.9288 STOI F/A= .066ZZ L H V= 18470. S _N T,F= 308.8 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	231	232	233	234	235
PERCENT MAX. CORRECTED POWER	0.0	39.9	99.4	0.0	23.1
CORRECTED SHAFT HP	0.0	79.7	198.9	0.0	46.2
MEASURED SHAFT HP	0.0	52.5	131.0	0.0	30.4
EXHAUST GAS TEMP., DEG.F	493.0	622.0	864.0	1084.0	949.0
SHAFT SPEED, N1, RPM	41890.0	41760.0	41500.0	41400.0	41420.0
COMPRESSOR DSCHG. PRES.,PSIA	42.5	41.5	41.1	37.2	39.1
COMPRESSOR DSCHG. TEMP,DEG F	387.0	394.0	403.0	356.0	361.0
EXHAUST GAS PRESS., PSIA	9.37	9.42	9.51	9.49	9.49
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.387	1.940
COMPRESSOR MAP FLOW,LB/SEC	3.93	3.67	3.34	4.39	4.31
FA RATIO BASED ON MAP FLOW	.0072	.0094	.0146	.0107	.0174
CORRECTED FUEL FLOW , LB/HR	102.0	124.0	175.0	190.0	190.0
FA RATIO CALC. FROM EMISSION	.0066	.0088	.0131	.0165	.0153
EQUIVALENCE RATIO	.097	.129	.191	.241	.225
LOADING W/P**N/V/E(T/540)	.465	.446	.406	.445	.434
COMB EFFIC FROM EMISSIONS	97.181	98.284	99.502	99.591	99.122

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.32	1.79	2.72	3.44	3.18
LB. CO2 PER LB. OF FUEL	3.02	3.06	3.12	3.13	3.10
WEIGHT FLOW, LB./HR.	308.1	379.5	546.6	593.9	589.2
CARBON MONOXIDE					
PPM BY VOLUME, WET	352.4	413.6	244.7	298.3	492.8
LB. PER 1000 LB. OF FUEL	51.222	45.184	17.886	17.229	38.565
WEIGHT FLOW, LB./HR.	5.225	5.593	3.138	3.273	5.887
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	232.5	134.4	21.8	15.8	51.8
LB. PER 1000 LB. OF FUEL	19.317	8.374	.877	.495	1.811
WEIGHT FLOW, LB./HR.	1.970	1.038	.154	.894	.344
RATIO LB HC/LB CO	.3771	.1857	.0491	.0287	.0592
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	9.8	16.8	32.5	44.8	36.5
LB. PER 1000 LB. OF FUEL	2.348	2.865	3.903	4.174	3.724
WEIGHT FLOW, LB./HR.	.239	.335	.683	.793	.708
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	4.2	4.5	3.8	2.8	3.8
LB. PER 1000 LB. OF FUEL	1.003	.886	.368	.198	.386
WEIGHT FLOW, LB./HR.	.102	.100	.063	.036	.058
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	14.0	20.5	35.5	46.8	39.5
LB. PER 1000 LB. OF FUEL	3.343	3.671	4.263	4.364	4.031
WEIGHT FLOW, LB./HR.	.341	.455	.746	.829	.766
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00706	.00707	.00706	.00709	.00709
SMOKE NUMBER	9.60	10.60	4.60	10.20	10.10
CORRECTED WEIGHT FLOW	.02117	.02121	.02124	.02127	.02132
SMOKE NUMBER	16.10	21.70	13.30	22.90	36.70
CORRECTED WEIGHT FLOW	.03526	.03534	.03539	.03536	.03551
SMOKE NUMBER	25.30	30.10	18.70	33.70	44.60
CORRECTED WEIGHT FLOW	.04939	.04948	.04955	.04953	.04972
SMOKE NUMBER	32.50	38.00	24.70	41.00	51.80
SMOKE NUMBER AT WA=0.023	21.60	25.40	15.50	27.20	38.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-19-75 FUEL=AV. KERO. P BARO= 19.69

DATA POINT NUMBER	231	232	233	234	235
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.225	5.593	3.138	3.273	5.807
UNBURNED HYDROCARBONS	1.978	1.038	.154	.094	.344
OXIDES OF NITROGEN	.341	.455	.746	.829	.766
NITRIC OXIDE	.239	.355	.683	.793	.788
POWER LEVEL HP	0.00	62.52	131.82	173.53	172.85
TOTAL CORRECTED HORSEPOWER	0.00	79.73	196.89	263.69	262.49
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	186.493	23.898	18.864	33.598
UNBURNED HYDROCARBONS	0.000	19.770	1.172	.542	1.990
OXIDES OF NITROGEN	0.000	8.666	5.694	4.778	4.430
NITRIC OXIDE	0.000	6.764	5.213	4.571	4.094

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

ENGINE MFR.: AIRESEARCH TEST FACILITY: PHX LAGC2 INSTR. DESCRIP.: FEDERAL REG V38 N136 CALC. DATE: 6-28-75
MODEL NO.: GTCP85-98CK S/N: 36179 ENGINE TYPE (CLASS): APU CALC. I.D.: 3
MAX SHP 200. + BLEED AIR EXTRACTION TO 1150. DEG. F EGT
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB. ADDITIVES: NONE

********** EXHAUST EMISSIONS PER EPA RATED WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 **********
********** EMISSIONS COMPUTED FROM TEST CONDITION NO. 5 **********

HYDROCARBONS (HC AS CH4)	1.652	LB. POLLUTANT PER 1000 HP.-HR.
CARBON MONOXIDE (CO)	31.712	LB. POLLUTANT PER 1000 HP.-HR.
OXIDES OF NITROGEN (NOX AS NO2)	4.465	LB. POLLUTANT PER 1000 HP.-HR.

********** ENGINE DESCRIPTION **********
COMBUSTOR TYPE: TANGENTIAL CAN P/N: 698168-3 SURFACE/VOLUME: .725 SQ IN/CU IN FUEL INJ. TYPE: DUAL ORIFICE
ENGINE TOTAL SERVICE: 0.0 HR. TIME SINCE ENGINE OVERHAUL: 0.0 HR.
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:

AIRCRAFT INSTALLATION *** MFR.: MODEL NO.: USER:

**********OPERATIONAL TEST DATA SUMMARY **********
GASEOUS EMISSION TEST NO.: 16 DATE: 6-28-75 TIME: 13.08 BARO. PRESS.: 19.698 IN. HGA.
AMBIENT AIR TEMP.: 59.0 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 380.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	236	237	238	239	240
POWER SETTING, CORRECTED HP.	0.00	79.56	196.85	0.00	46.00
N1 SPEED, RPM	41800.00	41720.00	41450.00	41350.00	41380.00
FUEL FLOW (MEAS.) LB./HR.	101.00	124.00	172.00	190.00	166.00
ENGINE CORE INLET AIRFLOW(CALC.) LB./SEC.	4.36	4.04	3.76	4.69	4.75
COMPRESSOR INLET TEMP., DEG. F	57.0	61.0	59.0	60.0	61.0
COMPRESSOR DISCHARGE AIR PRESSURE, PSIA	42.47	42.06	41.98	37.17	39.28
COMPRESSOR DISCHARGE AIR TEMP., DEG. F	387.00	394.00	401.00	363.00	364.00
COMPRESSOR BLEED AIRFLOW (MEAS.) LB./SEC.	0.00	0.00	0.00	1.57	1.26
BLEED AIR PRESSURE, PSIA	0.00	0.00	0.00	36.24	38.38
BLEED AIR TEMPERATURE, DEG. F	-0.00	-0.00	-0.00	389.00	388.00
ENGINE EXHAUST GAS TEMP., DEG. F	491.0	618.0	850.0	1014.0	949.0
EMISSION CONCENTRATION, WET ANALYSIS					
HYDROCARBON (HC AS CH4), PPMC	226.500	133.500	21.600	16.500	42.000
CARBON MONOXIDE (CO), PPMV	339.296	404.399	247.140	282.571	460.824
TOTAL OXIDES OF NITROGEN (NOX), PPMV	14.000	20.500	38.000	47.000	39.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.206	1.729	2.645	3.327	3.118
NITRIC OXIDE (NO), PPMV	12.000	18.000	35.000	44.000	37.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL					
HYDROCARBONS (HC AS CH4)	19.360	8.598	.928	.564	1.921
CARBON MONOXIDE (CO)	98.739	45.527	18.571	16.896	29.194
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.439	3.791	4.690	4.616	4.111
EMISSION RATE, LB. POLLUTANT/HR.					
HYDROCARBONS (HC AS CH4)	1.955	1.065	.160	.107	.286
CARBON MONOXIDE (CO)	9.125	5.645	3.194	3.210	5.488
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.347	.470	.807	.877	.773
ENGINE WORK OUTPUT, MEAS. SHP	0.00	52.47	130.86	0.00	30.33
ENGINE WORK OUTPUT, ISENTROPIC AIR HP	0.00	0.00	0.00	176.63	142.74
ENGINE WORK OUTPUT, TOTAL HP	0.00	52.47	130.86	176.63	173.07
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	97.11	98.18	99.48	99.55	99.16
F/A (EMISSIONS)	.006	.009	.013	.016	.015

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-20-75 FUEL=AV. KERO. P BARO= 19.69
RAT SHP= 200. RA EGT,F= 1150. RAT SPD= 41600. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	236	237	238	239	240
PERCENT MAX. CORRECTED POWER	0.0	39.8	99.4	0.0	23.0
CORRECTED SHAFT HP	0.0	79.6	198.8	0.0	46.0
MEASURED SHAFT HP	0.0	52.5	130.9	0.0	30.3
EXHAUST GAS TEMP., DEG.F	491.0	618.0	858.0	1014.0	949.0
SHAFT SPEED, N1, RPM	41380.0	41720.0	41450.0	41350.0	41388.0
COMPRESSOR DSCHG. PRES.,PSIA	42.5	42.1	42.0	37.2	39.3
COMPRESSOR DSCHG. TEMP.DEG F	387.0	394.0	401.0	363.0	364.0
EXHAUST GAS PRESS., PSIA	9.37	9.42	9.51	9.50	9.50
CORRECTED BLEED FLOW, LB/SEC	0.000	0.000	0.000	2.395	1.949
COMPRESSOR MAP FLOW,LB/SEC	3.99	3.73	3.47	4.39	4.32
FA RATIO BASED ON MAP FLOW	.0070	.0092	.0138	.0188	.0172
CORRECTED FUEL FLOW , LB/HR	101.0	124.0	172.0	190.0	188.0
FA RATIO CALC. FROM EMISSION	.0044	.0085	.0127	.0159	.0150
EQUIVALENCE RATIO	.094	.125	.186	.233	.221
LOADING W/P**N/V/E(T/540)	.473	.443	.408	.440	.431
COMB EFFIC FROM EMISSIONS	97.188	98.175	99.402	99.553	99.180

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE					
PERCENT BY VOLUME, WET	1.29	1.73	2.64	3.33	3.12
LB. CO2 PER LB. OF FUEL	3.02	3.06	3.12	3.13	3.10
WEIGHT FLOW, LB./HR.	305.1	379.3	537.8	593.9	583.6
CARBON MONOXIDE					
PPM BY VOLUME, WET	339.3	404.4	247.1	282.6	460.8
LB. PER 1000 LB. OF FUEL	50.739	45.527	18.571	16.896	29.194
WEIGHT FLOW, LB./HR.	5.125	5.645	3.194	3.218	5.488
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4					
PPM BY VOLUME, WET	226.5	133.5	21.6	16.5	42.8
LB. PER 1000 LB. OF FUEL	19.360	8.590	.928	.564	1.521
WEIGHT FLOW, LB./HR.	1.955	1.065	.168	.107	.286
RATIO LB HC/LB CO	.3816	.1887	.0580	.0334	.0521
NITRIC OXIDE (NO) - WEIGHTS AS NO2					
PPM BY VOLUME, WET	12.0	18.0	35.0	44.0	37.0
LB. PER 1000 LB. OF FUEL	2.946	3.329	4.328	4.322	3.850
WEIGHT FLOW, LB./HR.	.298	.413	.743	.821	.724
NITROGEN DIOXIDE (NO2)					
PPM BY VOLUME, WET	2.0	2.5	3.0	3.0	2.5
LB. PER 1000 LB. OF FUEL	.491	.462	.370	.295	.260
WEIGHT FLOW, LB./HR.	.050	.057	.064	.056	.049
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2					
PPM BY VOLUME, WET	14.0	20.5	38.0	47.0	39.5
LB. PER 1000 LB. OF FUEL	3.439	3.791	4.698	4.616	4.111
WEIGHT FLOW, LB./HR.	.347	.470	.807	.877	.773
SMOKE MEASUREMENT DATA					
CORRECTED WEIGHT FLOW	.00707	.00705	.00705	.00704	.00705
SMOKE NUMBER	4.80	9.60	7.80	10.80	11.40
CORRECTED WEIGHT FLOW	.02121	.02116	.02116	.02111	.02111
SMOKE NUMBER	17.50	19.90	12.00	24.10	22.90
CORRECTED WEIGHT FLOW	.03534	.03526	.03519	.03525	.03518
SMOKE NUMBER	24.10	28.90	18.10	33.70	37.30
CORRECTED WEIGHT FLOW	.04945	.04936	.04926	.04935	.04925
SMOKE NUMBER	28.90	33.70	24.10	43.40	42.20
SMOKE NUMBER AT WA=0.023	19.00	23.30	15.70	28.30	28.80

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).
4.COMBUSTION EFFICIENCY CALCULATED FROM CO,AND UHC AS VAPORIZED ORIGINAL FUEL ON LB/ LB FUEL BASIS.

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= GTCP85-98CK S/N= 36179 COMB P/N= 698168-3 TEST DATE 6-20-75 FUEL=AV. KERO. P BARO= 19.69

DATA POINT NUMBER	236	237	238	239	240
EMISSION RATE LB/HR					
CARBON MONOXIDE	5.125	5.645	3.194	3.218	5.488
UNBURNED HYDROCARBONS	1.955	1.865	.168	.187	.286
OXIDES OF NITROGEN	.347	.470	.887	.877	.773
NITRIC OXIDE	.298	.413	.743	.821	.724
POWER LEVEL HP	0.00	52.47	130.86	176.63	173.87
TOTAL CORRECTED HORSEPOWER	0.00	79.58	198.85	268.65	263.32
BRAKE SPECIFIC EMISSION INDEX LB/1000HP-HR					
CARBON MONOXIDE	0.000	107.593	24.418	18.175	31.712
UNBURNED HYDROCARBONS	0.000	20.382	1.219	.687	1.652
OXIDES OF NITROGEN	0.000	8.959	6.165	4.966	4.465
NITRIC OXIDE	0.000	7.867	5.678	4.649	4.182

NOTE**0. APPEARING IN BRAKE SPECIFIC EMISSION INDEX COLUMN DENOTES AN IDLE CONDITION

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-5-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 1
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	4.360	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.865	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.202	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.8	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869882-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:
USER: MODEL NO.:
ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 1 DATE: 11-5-75 TIME: BARO PRESS.: 28.780 IN. HGA.
AMBIENT AIR TEMP.: 19.00 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .001000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. F_ONRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	1	2	3	4	5	6	7
ACTUAL POWER SETTING, HORSEPOWER	33.3	49.1	65.0	195.0	455.5	585.7	653.0
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.11	7.53	9.98	29.89	69.60	89.49	100.20
N1 SPEED, RPM	27510.00	27500.00	27540.00	41720.00	41760.00	41730.00	41760.00
FUEL FLOW (MEAS.) LB./HR.	105.0	113.0	125.0	258.0	346.0	388.0	415.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.1	3.1	3.0	8.1	8.1	8.1	8.1
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	18.00	18.00	17.00	23.00	22.00	22.00	18.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.14	14.14	14.14	14.14	14.14	14.14	14.14
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	51.08	51.16	51.47	140.47	148.58	152.26	154.72
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	296.00	301.00	301.00	628.00	638.00	643.00	648.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	800.0	845.0	895.0	1032.0	1246.0	1347.0	1403.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.13	14.12	14.12	14.81	14.03	14.06	14.08
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	93.800	48.600	39.300	6.300	.900	.900	.600
CARBON MONOXIDE (CO), PPMV	225.166	282.598	186.904	65.235	26.732	19.839	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.600	25.500	28.300	57.500	90.200	99.250	109.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.840	2.023	2.151	1.886	2.519	2.879	3.066
NITRIC OXIDE (NO), PPMV	12.000	17.500	21.300	42.400	81.000	90.250	100.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	5.708	2.722	2.075	.382	.841	.836	.622
CARBON MONOXIDE (CO)	24.142	13.853	17.262	6.919	2.128	1.327	1.035
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.628	4.105	4.293	10.818	11.795	11.361	11.743
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.598	.308	.259	.899	.814	.814	.889
CARBON MONOXIDE (CO)	2.535	2.243	2.158	1.785	.736	.515	.430
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.381	.464	.537	2.585	4.081	4.408	4.873
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.93	99.29	99.41	99.80	99.95	99.97	99.97
F/A (EMISSIONS,CALC)	.0089	.0098	.0104	.0090	.0120	.0137	.0146

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-5-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 1
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	104.750	104.750	258.585	389.355	414.561	
FUEL MASS, LB	12.221	33.171	19.394	16.223	3.455	84.463
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	5.906	5.906	.334	.129	.115	3.280
RATE, LB HC/HR	.619	.619	.086	.050	.048	.496
MASS, LB HC	.072	.196	.006	.002	.000	.277
MASS, PERCENT OF TOTAL CYCLE	26.1	70.7	2.3	.8	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.368
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	24.382	24.382	6.859	1.185	.934	14.944
RATE, LB CO/HR	2.554	2.554	1.774	.461	.387	2.261
MASS, LB CO	.298	.809	.133	.019	.003	1.262
MASS, PERCENT OF TOTAL CYCLE	23.6	64.1	10.5	1.5	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.865
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.594	3.594	10.860	11.447	11.797	6.923
RATE, LB NOX/HR	.376	.376	2.801	4.457	4.891	1.047
MASS, LB NOX	.044	.119	.195	.186	.041	.585
MASS, PERCENT OF TOTAL CYCLE	7.5	20.4	33.4	31.8	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.202

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	24.4	34.1
HC (IDLE)	5.9	6.7
NOX (TAKEOFF)	11.8	24.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

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** AIRESEARCH EMISSION TEST SUMMARY **

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 1
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 8. REL HUM= 49.00 SPEC HUM= .001000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO.L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	1	2	3	4	5	6	7
PERCENT MAX. CORRECTED POWER	5.1	7.5	10.0	29.9	69.6	89.5	100.2
CORRECTED SHAFT HP	36.1	53.2	70.5	211.1	491.4	631.8	707.4
MEASURED SHAFT HP	33.3	49.1	65.0	195.8	455.5	585.7	653.8
SHAFT SPEED, N1, RPM	27510.0	27500.0	27540.0	41720.0	41760.0	41730.0	41760.0
COMPRESSOR INLET TEMP.,DEG.F	18.0	18.0	17.0	23.0	22.0	22.0	18.0
COMPRESSOR DSCHG. PRES.,PSIA	51.1	51.2	51.5	140.5	148.6	152.3	154.7
COMPRESSOR DSCHG. TEMP,DEG F	296.0	301.0	301.0	628.0	638.0	643.0	640.0
TURB INTERSTAGE TEMP., DEG.F	800.0	845.0	895.0	1032.0	1246.0	1347.0	1403.0
CORR BELMTH FLOW, LB/SEC	3.07	3.05	2.96	8.08	8.08	8.08	8.11
FA RATIO BASED ON BELLMTH.	.0095	.0103	.0117	.0089	.0119	.0134	.0142
MEASURED FUEL FLOW, LB/HR	105.0	113.0	125.0	258.0	346.0	388.0	415.0
FA RATIO CALC. FROM EMISSION	.0089	.0098	.0104	.0090	.0120	.0137	.0146
EQUIVALENCE RATIO	.131	.143	.152	.132	.176	.201	.214
LOADING W/P**N/V/E(T/540)	.330	.324	.312	.080	.071	.067	.066
COMB EFFIC FROM EMISSIONS	98.932	99.294	99.412	99.804	99.946	99.966	99.974

SUMMARY OF REDUCED EMISSION DATA

	1	2	3	4	5	6	7
CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.84	2.02	2.15	1.89	2.52	2.88	3.07
LB. CO2 PER LB. OF FUEL	3.10	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	325.5	352.0	390.2	810.7	1090.1	1222.9	1308.2
CARBON MONOXIDE							
PPM BY VOLUME, WET	225.2	202.6	186.9	65.2	26.7	19.0	15.8
LB. PER 1000 LB. OF FUEL	24.142	19.853	17.262	6.919	2.128	1.327	1.035
WEIGHT FLOW, LB./HR.	2.535	2.243	2.158	1.785	.736	.515	.430
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	93.0	48.6	39.3	6.3	.9	.9	.6
LB. PER 1000 LB. OF FUEL	5.700	2.722	2.075	.382	.041	.036	.022
WEIGHT FLOW, LB./HR.	.598	.308	.259	.099	.014	.014	.009
RATIO LB HC/LB CO	.2361	.1371	.1202	.0552	.0192	.0270	.0217
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	12.0	17.5	21.3	42.4	81.0	90.2	100.5
LB. PER 1000 LB. OF FUEL	2.113	2.817	3.231	7.387	10.592	10.331	10.803
WEIGHT FLOW, LB./HR.	.222	.318	.404	1.906	3.665	4.009	4.483
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	8.6	8.8	7.0	15.1	9.2	9.0	8.8
LB. PER 1000 LB. OF FUEL	1.515	1.288	1.062	2.631	1.203	1.030	.941
WEIGHT FLOW, LB./HR.	.159	.146	.133	.679	.416	.400	.398
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.6	25.5	28.3	57.5	90.2	99.2	109.2
LB. PER 1000 LB. OF FUEL	3.628	4.105	4.293	10.018	11.795	11.361	11.743
WEIGHT FLOW, LB./HR.	.381	.464	.537	2.585	4.081	4.408	4.873
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00710	.00710	.00705	.00702	.00702	.00700	.00699
SMOKE NUMBER	1.20	2.40	3.50	4.70	3.50	3.50	5.90
CORRECTED WEIGHT FLOW	.02130	.02130	.02114	.02105	.02105	.02101	.02096
SMOKE NUMBER	3.50	3.50	5.90	8.20	14.10	12.90	10.60
CORRECTED WEIGHT FLOW	.03557	.03549	.03523	.03508	.03508	.03501	.03494
SMOKE NUMBER	7.10	7.10	5.90	12.90	20.00	18.80	20.00
CORRECTED WEIGHT FLOW	.04979	.04969	.04924	.04912	.04912	.04902	.04892
SMOKE NUMBER	7.10	8.20	4.70	14.10	24.70	25.90	22.40
SMOKE NUMBER AT WA=0.023	4.70	5.30	5.00	10.10	15.80	15.60	14.98

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAGC2 INSTR DESCRIP : FED REG V38 N136 CARD DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P84881 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 1
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	4.031	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	20.915	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.290	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.7	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 1 DATE: 11-6-75 TIME: BARO PRESS.: 28.780 IN. HGA.
AMBIENT AIR TEMP.: 19.00 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .001000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	8	9	10	11	12	13	14
ACTUAL POWER SETTING, HORSEPOWER	32.7	49.0	64.9	194.5	456.9	580.9	653.0
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.02	7.53	9.96	29.87	70.11	89.23	100.31
N1 SPEED, RPM	27560.00	27560.00	27520.00	41750.00	41730.00	41750.00	41760.00
FUEL FLOW (MEAS.) LB./HR.	105.0	114.0	125.0	264.0	358.0	396.0	420.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	3.0	8.0	255.2	8.1	8.1
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	16.00	17.00	18.00	17.00	18.00	17.00	17.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.14	14.14	14.14	14.14	14.14	14.14	14.14
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	51.23	51.47	51.33	140.32	149.31	153.24	155.78
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	300.00	300.00	302.00	623.00	632.00	635.00	639.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	805.0	860.0	921.0	1071.0	1250.0	1345.0	1401.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	13.99	14.00	14.04	14.06
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	82.500	69.600	54.000	14.700	6.900	6.800	6.800
CARBON MONOXIDE (CO), PPMV	234.741	208.652	198.415	66.076	32.851	27.953	21.057
TOTAL OXIDES OF NITROGEN (NOX), PPMV	13.700	24.100	27.800	57.000	86.100	97.250	109.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.827	2.000	2.180	1.858	2.566	2.845	3.072
NITRIC OXIDE (NO), PPMV	15.100	17.000	23.600	44.700	79.000	91.000	101.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	5.093	3.938	2.810	.904	.308	.242	.224
CARBON MONOXIDE (CO)	25.352	*20.654	18.064	7.106	2.566	1.970	1.375
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.495	3.919	4.157	10.070	11.049	11.257	11.744
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.535	.449	.351	.239	.188	.096	.094
CARBON MONOXIDE (CO)	2.662	2.355	2.258	1.876	.898	.780	.577
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.367	.447	.520	2.658	3.867	4.458	4.932
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.96	99.17	99.33	99.75	99.91	99.93	99.95
F/A (EMISSIONS,CALC)	.0089	.0097	.0105	.0089	.0122	.0135	.0146

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 1
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.176	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	104.923	104.923	264.923	399.274	420.681	
FUEL MASS, LB	12.241	33.226	19.869	16.636	3.506	85.478
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	5.103	5.103	.915	.297	.273	2.996
RATE, LB HC/HR	.535	.535	.242	.119	.115	.459
MASS, LB HC	.062	.170	.018	.005	.001	.256
MASS, PERCENT OF TOTAL CYCLE	24.4	66.2	7.1	1.9	.4	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.031
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	25.413	25.413	7.032	1.767	1.248	15.547
RATE, LB CO/HR	2.666	2.666	1.863	.705	.525	2.380
MASS, LB CO	.311	.844	.140	.029	.004	1.329
MASS, PERCENT OF TOTAL CYCLE	23.4	63.5	10.5	2.2	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						20.915
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.489	3.489	10.114	11.381	11.811	6.986
RATE, LB NOX/HR	.366	.366	2.679	4.544	4.968	1.057
MASS, LB NOX	.043	.116	.201	.189	.041	.590
MASS, PERCENT OF TOTAL CYCLE	7.2	19.6	34.0	32.1	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.290

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	25.4	33.6
HC (IDLE)	5.1	6.3
NOX (TAKEOFF)	11.8	23.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P34801 COMB P/N= 869982-4 FUEL= AV. KERO. TEST NO.= 1

RAT SHP= 706. RA EGT,F= 1658. RAT SPD= 41738. DEW PT,F= 8. REL HUM= 49.80 SPEC HUM= .001888

FUEL M/C= 1.9288 STOI F/A= .06822 L H V= 18478. S LN T,F= 388.8 FLO.L/HR= 10.160 SL TIM.D= 0.5888

DATA POINT NUMBER	8	9	10	11	12	13	14
PERCENT MAX. CORRECTED POWER	5.0	7.5	10.0	20.0	30.1	40.2	100.3
CORRECTED SHAFT HP	35.5	53.2	70.3	210.9	405.8	629.9	738.2
MEASURED SHAFT HP	32.7	49.5	64.3	194.5	456.9	588.9	653.8
SHAFT SPEED, HI, RPM	27560.0	27560.0	27520.0	41750.0	41738.8	41758.8	41768.8
COMPRESSOR INLET TEMP.,DEG.F	16.0	17.0	18.0	17.8	18.0	17.8	17.8
COMPRESSOR DSCHG. PRES.,PSIA	91.2	91.5	91.3	140.3	149.3	153.2	155.7
COMPRESSOR DSCHG. TEMP.DEG F	388.8	388.8	382.8	623.8	632.8	635.8	639.8
TURB INTERSTAGE TEMP., DEG.F	805.0	860.8	921.8	1071.8	1250.8	1345.8	1401.8
CORR SELNTH FLOW, LB/SEC	3.04	3.05	2.96	8.02	295.23	8.08	8.09
FA RATIO BASED ON SELLNTH.	.0096	.0103	.0117	.0091	.0084	.0136	.0144
MEASURED FUEL FLOW, LB/HR	105.0	114.0	125.0	264.0	350.0	396.0	428.0
FA RATIO CALC. FROM EMISSION	.0089	.0097	.0105	.0089	.0122	.0135	.0146
EQUIVALENCE RATIO	.130	.142	.154	.131	.179	.198	.214
LOADING M/P**N/V/E(T/540)	.323	.321	.312	.080	2.254	.060	.056
COMB EFFIC FROM EMISSIONS	98.957	99.169	99.329	99.754	99.913	99.932	99.949

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.83	2.98	2.18	1.86	2.57	2.85	3.07
LB. CO2 PER LB. OF FUEL	3.10	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	325.5	354.6	389.7	829.1	1102.2	1247.5	1323.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	234.7	208.7	198.0	66.1	82.9	28.8	21.1
LB. PER 1000 LB. OF FUEL	29,352	28,654	18,884	7,196	2,566	1,978	1,375
WEIGHT FLOW, LB./HR.	2.662	2.355	2.258	1.876	.898	.788	.577
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	82.5	69.6	54.8	14.7	6.9	6.8	6.8
LB. PER 1000 LB. OF FUEL	9,893	3,938	2,818	.984	.388	.242	.224
WEIGHT FLOW, LB./HR.	.535	.449	.351	.239	.188	.896	.894
RATIO LB HC/LB CO	.2889	.1987	.1556	.1272	.1281	.1227	.1629
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	19.1	17.8	23.8	44.7	79.8	91.8	101.5
LB. PER 1000 LB. OF FUEL	2,679	2,764	3,529	7,897	10,138	10,534	10,886
WEIGHT FLOW, LB./HR.	.281	.315	.441	2.085	3,548	4.171	4.572
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.6	7.1	4.2	12.3	7.1	5.3	8.8
LB. PER 1000 LB. OF FUEL	.816	1.154	.628	2.173	.911	.723	.958
WEIGHT FLOW, LB./HR.	.086	.132	.079	.574	.819	.286	.368
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	19.7	24.1	27.8	57.8	86.1	97.2	109.5
LB. PER 1000 LB. OF FUEL	3,495	3,919	4,157	10,070	11,049	11,257	11,744
WEIGHT FLOW, LB./HR.	.367	.447	.528	2.658	3.867	4,458	4,932
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00725	.00720	.00719	.00716	.00716	.00714	.00713
SMOKE NUMBER	3.50	2.48	4.78	4.78	5.98	4.78	5.98
CORRECTED WEIGHT FLOW	.02174	.02161	.02157	.02147	.02147	.02143	.02139
SMOKE NUMBER	5.98	5.98	4.78	18.68	16.58	14.18	14.18
CORRECTED WEIGHT FLOW	.03623	.03602	.03589	.03577	.03578	.03571	.03564
SMOKE NUMBER	7.18	5.98	5.98	14.18	21.28	20.88	18.88
CORRECTED WEIGHT FLOW	.05062	.05043	.05023	.05018	.05008	.04999	.04990
SMOKE NUMBER	9.48	9.48	8.28	18.88	27.18	25.98	22.48
SMOKE NUMBER AT WA=0.823	8.48	5.98	5.98	12.18	17.78	16.28	19.48

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAC02 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 1
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	4.893	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.567	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.922	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.3	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 9.8 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869832-6 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 8.0 HR TIME SINCE ENGINE OVERHAUL: 8.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 1 DATE: 11-6-75 TIME: BARO PRESS.: 28.788 IN. HGA.
AMBIENT AIR TEMP.: 19.00 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .001080 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	15	16	17	18	19	20	21
ACTUAL POWER SETTING, HORSEPOWER	35.0	58.0	66.7	196.0	454.9	587.1	651.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.37	7.67	10.25	30.01	69.73	90.00	100.06
N1 SPEED, RPM	27548.00	27538.00	27650.00	41750.00	41788.00	41748.00	41748.00
FUEL FLOW (MEAS.) LB./HR.	107.0	113.0	124.0	260.0	348.0	398.0	418.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.1	3.8	2.9	8.9	8.0	8.0	7.9
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	17.00	17.00	17.00	20.00	19.00	18.00	17.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.14	14.14	14.14	14.14	14.14	14.14	14.14
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	50.93	51.18	51.72	148.47	149.31	153.49	155.78
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	298.00	300.00	302.00	627.00	634.00	637.00	639.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	795.0	857.0	916.0	1867.0	1253.0	1332.0	1408.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	13.98	14.08	14.05	14.06
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	81.000	63.600	49.200	10.500	6.000	6.000	6.000
CARBON MONOXIDE (CO), PPMV	217.100	206.316	188.279	61.836	26.732	19.442	19.442
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.400	22.600	26.700	53.900	85.600	95.750	106.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.845	2.000	2.165	1.904	2.966	2.879	3.095
NITRIC OXIDE (NO), PPMV	14.000	16.000	22.200	43.600	78.000	91.750	98.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.950	3.600	2.579	.630	.268	.239	.222
CARBON MONOXIDE (CO)	23.247	20.431	17.206	6.412	2.869	1.895	1.260
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.540	3.676	4.822	9.301	10.964	10.959	11.284
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.530	.407	.320	.164	.093	.095	.091
CARBON MONOXIDE (CO)	2.487	2.309	2.141	1.667	.727	.539	.517
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.384	.415	.499	2.418	3.824	4.362	4.626
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.02	99.28	99.37	99.79	99.93	99.95	99.99
F/A (EMISSIONS,CALC)	.0098	.0097	.0104	.0091	.0122	.0137	.0147

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PWA LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-73
MODEL NO.: TPE331-5-251M S/N: P84891 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 1
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	33.500
RATED POWER, PERCENT	3.000	3.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.000	635.400	786.000	
HP-HR	4.118	11.176	15.885	26.475	5.893	63.540
FUEL FLOW, LB/HR	186.367	186.367	259.930	397.765	418.118	
FUEL MASS, LB	12.409	33.683	19.495	16.574	3.418	85.579
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	5.217	5.217	.431	.241	.219	8.089
RATE, LB HC/HR	.959	.955	.104	.096	.090	.461
MASS, LB HC	.065	.176	.012	.004	.001	.258
MASS, PERCENT OF TOTAL CYCLE	29.1	68.2	4.8	1.6	.3	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.053
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	23.681	23.681	6.414	1.354	1.264	14.524
RATE, LB CO/HR	2.519	2.519	1.667	.539	.518	2.227
MASS, LB CO	.294	.798	.129	.022	.004	1.243
MASS, PERCENT OF TOTAL CYCLE	23.6	64.2	10.4	1.8	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.567
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.591	3.591	9.299	18.953	11.288	6.624
RATE, LB NOX/HR	.382	.382	2.417	4.397	4.629	1.815
MASS, LB NOX	.045	.121	.181	.182	.039	.567
MASS, PERCENT OF TOTAL CYCLE	7.9	21.3	32.0	32.0	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.922

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.0
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	23.7	33.7
HC (IDLE)	5.2	6.4
NOX (TAKEOFF)	11.3	24.2

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-9-291M S/N= P84801 COMB P/N= 869882-4 FUEL= AV. KERO. TEST NO.= 1

RAT SHP= 796. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 8. REL HUM= 49.88 SPEC HUM= .001860

FUEL M/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO,L/M= 14.168 SL TIM,S= 6.9888

DATA POINT NUMBER	15	16	17	18	19	20	21
PERCENT MAX. CORRECTED POWER	5.4	7.7	10.3	30.0	69.7	90.1	100.1
CORRECTED SHAFT HP	37.9	54.2	72.4	211.9	492.3	636.0	706.5
MEASURED SHAFT HP	35.0	50.0	66.7	196.0	454.9	587.1	651.5
SHAFT SPEED, N1, RPM	27540.0	27530.0	27650.0	41750.0	41780.0	41740.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	17.0	17.0	17.0	20.0	19.0	16.0	17.0
COMPRESSOR DSCHG. PRES.,PSIA	50.9	51.2	51.7	140.5	149.3	152.5	155.7
COMPRESSOR DSCHG. TEMP.DEG F	298.0	300.0	302.0	627.0	634.0	637.0	639.0
TURB INTERSTAGE TEMP., DEG.F	795.0	857.0	916.0	1067.0	1253.0	1332.0	1400.0
CORR BELLMTH FLOW, LB/SEC	3.06	2.98	2.93	7.99	8.00	7.95	7.89
FA RATIO BASED ON BELLMTH.	.0097	.0105	.0117	.0090	.0121	.0139	.0144
MEASURED FUEL FLOW, LB/HR	107.0	113.9	124.0	260.0	348.0	396.0	410.0
FA RATIO CALC. FROM EMISSION	.0090	.0097	.0104	.0091	.0122	.0137	.0147
EQUIVALENCE RATIO	.731	.142	.193	.134	.179	.201	.216
LOADING W/P**N/V/E(T/540)	.330	.318	.305	.079	.070	.066	.064
COMB EFFIC FROM EMISSIONS	99.816	99.204	99.368	99.796	99.927	99.967	99.951

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.84	2.08	2.17	1.98	2.57	2.88	3.10
LB. CO2 PER LB. OF FUEL	3.18	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	332.1	351.7	386.9	817.0	1096.2	1254.2	1292.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	217.1	286.3	166.3	61.0	26.7	19.4	19.4
LB. PER 1000 LB. OF FUEL	23.247	28.431	17.266	6.412	2.089	1.355	1.268
WEIGHT FLOW, LB./HR.	2.487	2.389	2.141	1.667	.727	.539	.517
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	81.0	63.6	49.2	18.5	6.8	6.8	6.8
LB. PER 1000 LB. OF FUEL	4.956	3.608	2.579	.638	.268	.239	.222
WEIGHT FLOW, LB./HR.	.538	.407	.328	.164	.093	.095	.091
RATIO LB HC/LB CO	.2132	.1762	.1494	.0983	.1283	.1764	.1764
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.0	18.0	22.2	43.8	78.8	91.7	98.8
LB. PER 1000 LB. OF FUEL	2.462	2.926	3.344	7.558	10.812	10.581	10.512
WEIGHT FLOW, LB./HR.	.263	.331	.415	1.969	3.484	4.179	4.318
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.4	4.6	4.5	10.1	7.6	4.8	7.3
LB. PER 1000 LB. OF FUEL	1.126	.748	.678	1.743	.976	.458	.772
WEIGHT FLOW, LB./HR.	.120	.089	.084	.453	.339	.182	.316
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.4	22.6	26.7	53.9	85.6	95.7	106.8
LB. PER 1000 LB. OF FUEL	3.588	3.676	4.022	9.301	10.988	10.959	11.284
WEIGHT FLOW, LB./HR.	.384	.419	.499	2.418	3.824	4.362	4.626
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00710	.00708	.00707	.00706	.00705	.00704	.00704
SMOKE NUMBER	3.50	1.20	2.40	3.50	3.50	4.70	4.70
CORRECTED WEIGHT FLOW	.02130	.02129	.02121	.02119	.02116	.02111	.02111
SMOKE NUMBER	4.70	3.50	3.50	8.20	16.50	12.90	14.10
CORRECTED WEIGHT FLOW	.03549	.03542	.03535	.03532	.03526	.03519	.03518
SMOKE NUMBER	8.20	4.70	4.70	12.90	21.20	18.80	18.80
CORRECTED WEIGHT FLOW	.04969	.04954	.04949	.04945	.04936	.04926	.04925
SMOKE NUMBER	8.20	8.23	5.90	17.60	27.10	23.50	23.50
SMOKE NUMBER AT WA=8.023	8.20	4.58	4.18	18.70	17.30	19.20	19.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

**** AIRESEARCH EMISSION TEST SUMMARY ****

ENG MFG : AIRESEARCH TEST FACIL : PNX LAGG2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.8 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 2
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

**** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ****

HYDROCARBONS (CH AS CH4)	5.228	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.695	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.976	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	14.7	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 9.0 PERCENT RATED TAKEOFF POWER AT 69. PERCENT RATED TAKEOFF N1 RPM

**** ENGINE DESCRIPTION ****

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**** OPERATIONAL TEST DATA SUMMARY ****

GASEOUS EMISSION TEST NO.: 2 DATE: 11-6-75 TIME: BARO PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 19.00 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .002800 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 380.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

**** COMPUTED EMISSIONS ****

TEST CONDITION	22	23	24	25	26	27	28
ACTUAL POWER SETTING, HORSEPOWER	33.6	49.4	65.9	194.2	457.8	581.8	644.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.15	7.58	10.11	29.83	69.96	88.84	98.94
N1 SPEED, RPM	27530.00	27520.00	27520.00	41708.00	41740.00	41760.00	41778.00
FUEL FLOW (MEAS.) LB./HR.	106.8	108.6	121.0	256.0	346.0	398.0	421.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.1	3.0	3.0	8.0	8.0	8.0	8.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	20.00	19.00	19.00	18.00	21.00	22.00	18.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.13	14.13	14.13	14.13	14.13	14.13	14.13
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	50.69	51.00	51.57	140.72	147.94	152.81	154.72
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	288.00	290.00	300.00	619.00	633.00	638.00	637.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	806.0	878.0	927.0	1066.0	1260.0	1357.0	1395.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.11	14.11	13.97	13.99	14.03	14.05
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	106.500	60.000	57.000	12.300	6.300	6.000	9.300
CARBON MONOXIDE (CO), PPMV	223.264	203.520	201.660	65.235	27.953	15.821	15.420
TOTAL OXIDES OF NITROGEN (NOX), PPMV	41.300	23.100	27.100	53.000	84.500	97.250	104.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.854	2.047	2.230	1.931	2.602	2.867	3.031
NITRIC OXIDE (NO), PPMV	13.900	16.000	21.000	40.900	74.750	90.000	96.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	6.476	3.321	2.689	.726	.277	.248	.352
CARBON MONOXIDE (CO)	23.752	19.787	17.883	6.754	2.153	1.197	1.020
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.722	3.674	3.948	9.814	10.693	11.175	11.383
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.686	.359	.358	.186	.096	.094	.148
CARBON MONOXIDE (CO)	2.518	2.128	2.164	1.729	.745	.432	.438
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.395	.397	.478	2.388	3.700	4.358	4.759
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.87	99.25	99.33	99.78	99.93	99.95	99.95
F/A (EMISSIONS,CALC)	.0090	.0099	.0108	.0093	.0124	.0136	.0144

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P84881 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 2
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.116	11.178	15.885	26.475	5.883	63.948
FUEL FLOW, LB/HR	186.388	186.388	256.443	389.973	431.684	
FUEL MASS, LB	12.483	33.664	19.233	16.249	3.597	85.146
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	6.784	6.784	.615	.288	1.242	3.982
RATE, LB HC/HR	.721	.721	.158	.881	.536	.595
MASS, LB HC	.084	.228	.012	.883	.004	.332
MASS, PERCENT OF TOTAL CYCLE	25.3	68.7	3.6	1.0	1.3	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						5.220
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	24.893	24.893	6.569	.439	2.266	14.697
RATE, LB CO/HR	2.561	2.561	1.684	.170	.978	2.241
MASS, LB CO	.299	.811	.126	.007	.008	1.251
MASS, PERCENT OF TOTAL CYCLE	23.9	64.8	10.1	.6	.7	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.695
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.739	3.739	9.865	11.333	11.847	6.698
RATE, LB NOX/HR	.397	.397	2.325	4.419	4.769	1.821
MASS, LB NOX	.046	.126	.174	.184	.048	.578
MASS, PERCENT OF TOTAL CYCLE	8.1	22.8	30.6	32.3	7.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.976

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	24.1	33.9
HC (IDLE)	6.4	6.3
NOX (TAKEOFF)	11.8	23.4

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY. CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84881 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 2
RAT SHP= 706. RA EGT,F= 1658. RAT SPD= 41730. DEW PT,F= 19. REL HUM= 100.00 SPEC HUM= .002888
FUEL A/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO,L/HR= 14,168 SL TIM,S= 6.5888

DATA POINT NUMBER	22	23	24	25	26	27	28
PERCENT MAX. CORRECTED POWER	5.2	7.6	10.1	29.6	70.0	88.6	98.9
CORRECTED SHAFT HP	36.4	53.5	71.4	210.6	493.9	627.3	698.5
MEASURED SHAFT HP	33.6	49.4	69.9	194.2	457.8	581.8	644.3
SHAFT SPEED, N1, RPM	27520.0	27520.0	27520.0	41780.0	41740.0	41760.0	41770.0
COMPRESSOR INLET TEMP.,DEG.F	20.0	19.0	19.0	18.0	21.0	22.0	18.0
COMPRESSOR DSCHG. PRES.,PSIA	50.7	51.1	51.6	140.7	147.9	152.0	154.7
COMPRESSOR DSCHG. TEMP,DEG F	388.0	298.0	388.0	619.0	633.0	636.0	637.0
TURB INTERSTAGE TEMP., DEG.F	686.0	676.0	917.0	1066.0	1260.0	1357.0	1395.0
CORR BELLMTH FLOW, LB/SEC	3.09	2.99	2.98	7.98	7.97	8.04	8.02
FA RATIO BASED ON BELLMTH.	.0095	.0101	.0113	.0089	.0121	.0135	.0145
MEASURED FUEL FLOW, LB/HR	106.0	108.0	121.0	256.0	346.0	390.0	421.0
FA RATIO CALC. FROM EMISSION	.0090	.0099	.0108	.0093	.0124	.0136	.0144
EQUIVALENCE RATIO	.182	.149	.198	.136	.102	.208	.211
LOADING W/P**N/V/E(T/540)	.333	.318	.312	.080	.071	.068	.066
COMB EFFIC FROM EMISSIONS	98.878	99.248	99.326	99.777	99.925	99.953	99.945

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.85	2.05	2.24	1.93	2.68	2.87	3.03
LB. CO2 PER LB. OF FUEL	3.18	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	326.5	336.3	377.3	804.2	1089.9	1229.1	1326.8
CARBON MONOXIDE							
PPM BY VOLUME, WET	223.3	203.5	201.7	69.2	28.8	15.8	15.4
LB. PER 1000 LB. OF FUEL	23.752	19.787	17.863	6.754	2.153	1.187	1.020
WEIGHT FLOW, LB./HR.	2.518	2.128	2.164	1.729	.745	.432	.430
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	106.5	60.8	97.8	12.3	6.3	6.8	9.3
LB. PER 1000 LB. OF FUEL	6.476	3.321	2.889	.728	.277	.248	.352
WEIGHT FLOW, LB./HR.	.686	.359	.358	.186	.096	.094	.148
RATIO LB HC/LB CO	.2727	.1685	.1616	.1878	.1288	.2168	.3447
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.9	16.8	21.8	48.9	74.7	90.8	96.3
LB. PER 1000 LB. OF FUEL	2.429	2.863	3.176	6.956	9.459	10.342	10.461
WEIGHT FLOW, LB./HR.	.257	.309	.384	1.781	3.273	4.033	4.404
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	7.4	5.1	5.3	12.1	9.8	7.3	7.7
LB. PER 1000 LB. OF FUEL	1.293	.811	.772	2.858	1.234	.833	.842
WEIGHT FLOW, LB./HR.	.137	.088	.093	.527	.427	.325	.355
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.3	23.1	27.1	53.8	84.5	97.2	104.0
LB. PER 1000 LB. OF FUEL	3.722	3.674	3.948	9.814	10.693	11.175	11.303
WEIGHT FLOW, LB./HR.	.395	.397	.478	2.308	3.700	4.358	4.759
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00710	.00708	.00711	.00710	.00707	.00701	.00695
SMOKE NUMBER	1.20	0.00	3.60	1.20	3.60	3.60	3.60
CORRECTED WEIGHT FLOW	.02129	.02125	.02133	.02130	.02122	.02103	.02084
SMOKE NUMBER	11.98	3.60	4.80	8.38	11.98	18.78	18.78
CORRECTED WEIGHT FLOW	.03548	.03542	.03554	.03547	.03537	.03511	.03473
SMOKE NUMBER	9.30	10.78	4.80	10.78	17.98	17.98	16.78
CORRECTED WEIGHT FLOW	.04968	.04963	.04965	.04960	.04962	.04924	.04853
SMOKE NUMBER	8.38	8.38	7.18	15.58	25.88	21.48	19.88
SMOKE NUMBER AT WA=0.023	7.98	7.28	9.18	9.88	14.78	13.68	12.88

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP LEED REG V38 N136 CALC DATE :11-7-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: Z
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: Z
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.145	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.944	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.923	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.2	SMOKE NUMBER, MAXIMUM AT TAKE-OFF MODE, 18 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.8 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 2 DATE: 11-7-75 TIME: BARO PRESS.: 28.848 IN. HGA.
AMBIENT AIR TEMP.: 19.00 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .002088 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	29	30	31	32	33	34	35
ACTUAL POWER SETTING, HORSEPOWER	33.2	48.2	64.7	195.9	459.9	587.9	651.8
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.07	7.37	9.89	29.94	70.34	89.92	99.68
N1 SPEED, RPM	27560.00	27550.00	27550.00	41740.00	41770.00	41760.00	41760.00
FUEL FLOW (MEAS.) LB./HR.	103.0	115.0	125.0	260.0	392.0	408.0	426.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	2.9	6.0	8.0	8.0	8.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	19.00	19.00	19.00	20.00	19.00	19.00	18.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.11	14.11	14.11	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	50.59	50.59	50.59	148.96	148.58	153.80	154.72
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	302.00	300.00	303.00	622.00	631.00	635.00	636.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	822.0	880.0	956.0	1875.0	1273.0	1372.0	1415.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.15	14.15	14.01	14.03	14.07	14.07
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	66.000	44.100	46.200	11.100	6.600	9.800	12.000
CARBON MONOXIDE (CO), PPMV	225.642	206.316	202.598	57.686	27.953	19.846	17.631
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.000	25.300	29.000	54.500	82.500	96.750	104.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.881	2.070	2.336	1.936	2.608	2.974	3.136
NITRIC OXIDE (NO), PPMV	14.088	19.000	24.200	42.200	74.500	91.000	98.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.964	2.415	2.245	.656	.290	.347	.439
CARBON MONOXIDE (CO)	23.713	19.767	17.224	5.961	2.149	1.338	1.140
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.798	3.982	4.058	9.251	10.419	10.716	10.951
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.408	.278	.281	.170	.182	.139	.187
CARBON MONOXIDE (CO)	2.442	2.273	2.153	1.550	.756	.535	.486
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.391	.458	.506	2.405	3.667	4.286	4.665
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.09	99.32	99.40	99.80	99.92	99.94	99.93
F/A (EMISSIONS,CALC)	.0091	.0100	.0113	.0093	.0124	.0141	.0149

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-7-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 2
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	102.533	102.533	268.591	408.567	424.628	
FUEL MASS, LB	11.962	32.469	19.544	16.690	3.539	84.204
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.052	4.052	.635	.332	.522	2.373
RATE, LB HC/HR	.415	.415	.166	.133	.221	.356
MASS, LB HC	.048	.132	.012	.006	.002	.208
MASS, PERCENT OF TOTAL CYCLE	24.3	65.8	6.2	2.8	.9	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.145
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	23.887	23.887	9.937	1.338	1.167	14.295
RATE, LB CO/HR	2.449	2.449	1.547	.533	.496	2.156
MASS, LB CO	.286	.776	.116	.022	.004	1.204
MASS, PERCENT OF TOTAL CYCLE	23.7	64.4	9.6	1.8	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.944
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.786	3.786	9.267	18.723	18.931	6.733
RATE, LB NOX/HR	.388	.388	2.489	4.295	4.642	1.015
MASS, LB NOX	.045	.123	.181	.179	.039	.567
MASS, PERCENT OF TOTAL CYCLE	8.0	21.7	31.9	31.6	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.923

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

POLLUTANT	EPA LTO-CYCLE LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.6
HC	4.9
NOX	12.9

POLLUTANT (MODE)	REQUIRED EMISSION INDEX, LBP/1000 LB FUEL A	B
CO (IDLE)	23.9	35.1
HC (IDLE)	4.1	6.6
NOX (TAKEOFF)	18.9	23.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 2
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 19. REL HUM= 100.00 SPEC HUM= .002888
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	29	30	31	32	33	34	35
PERCENT MAX. CORRECTED POWER	5.1	7.4	9.9	29.9	78.3	89.9	99.8
CORRECTED SHAFT HP	35.9	52.0	69.8	211.4	496.6	634.8	784.6
MEASURED SHAFT HP	33.2	48.2	64.7	195.9	459.9	587.9	651.8
SHAFT SPEED, N1, RPM	27560.0	27550.0	27550.0	41740.0	41770.0	41760.0	41760.0
COMPRESSOR INLET TEMP.,DEG.F	19.0	19.0	19.0	20.0	19.0	19.0	18.0
COMPRESSOR DSCHG. PRES.,PSIA	50.6	50.6	50.6	141.8	146.6	153.8	154.7
COMPRESSOR DSCHG. TEMP.,DEG F	302.0	300.0	303.0	622.0	631.8	635.0	636.8
TURB INTERSTAGE TEMP., DEG.F	822.0	880.0	956.0	1075.0	1273.0	1372.0	1415.0
CORR BELMTH FLOW, LB/SEC	3.05	2.96	2.91	8.00	8.00	8.03	8.03
FA RATIO BASED ON BELLMTH.	.0094	.0108	.0113	.0099	.0122	.0138	.0147
MEASURED FUEL FLOW, LB/HR	103.0	115.0	125.8	260.0	352.8	480.0	426.8
FA RATIO CALC. FROM EMISSION	.0091	.0108	.0113	.0093	.0124	.0141	.0149
EQUIVALENCE RATIO	.134	.147	.165	.136	.182	.207	.218
LOADING W/P**N/V/E(T/540)	.330	.322	.314	.088	.071	.068	.066
COMB EFFIC FROM EMISSIONS	99.094	99.323	99.398	99.802	99.924	99.938	99.935

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.88	2.07	2.34	1.94	2.61	2.97	3.14
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	319.9	358.4	390.1	817.2	1108.6	1260.4	1342.4
CARBON MONOXIDE							
PPM BY VOLUME, WET	225.6	206.3	202.6	57.7	28.8	19.8	17.8
LB. PER 1000 LB. OF FUEL	23.713	19.767	17.224	5.961	2.149	1.338	1.148
WEIGHT FLOW, LB./HR.	2.442	2.273	2.153	1.550	.756	.535	.486
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	66.0	44.1	46.2	11.1	6.6	9.8	12.8
LB. PER 1000 LB. OF FUEL	8.964	2.415	2.245	.656	.298	.347	.439
WEIGHT FLOW, LB./HR.	.498	.278	.281	.170	.102	.139	.187
RATIO LB HC/LB CO	.1672	.1222	.1303	.1198	.1350	.2592	.3847
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.0	19.8	24.2	42.2	74.5	91.8	98.8
LB. PER 1000 LB. OF FUEL	2.417	2.998	3.388	7.163	9.489	10.079	10.374
WEIGHT FLOW, LB./HR.	.249	.344	.422	1.863	3.312	4.832	4.419
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.0	6.3	4.8	12.3	8.8	5.8	5.5
LB. PER 1000 LB. OF FUEL	1.381	.991	.670	2.088	1.010	.637	.578
WEIGHT FLOW, LB./HR.	.142	.114	.084	.543	.356	.255	.246
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.8	25.3	29.8	54.5	82.5	96.7	104.2
LB. PER 1000 LB. OF FUEL	3.798	3.982	4.058	9.251	10.419	10.716	10.951
WEIGHT FLOW, LB./HR.	.391	.458	.506	2.405	3.667	4.286	4.665
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00703	.00703	.00701	.00712	.00704	.00705	.00703
SMOKE NUMBER	2.40	.60	1.20	3.60	3.60	4.80	10.70
CORRECTED WEIGHT FLOW	.02114	.02110	.02102	.02136	.02112	.02114	.02109
SMOKE NUMBER	4.80	3.00	3.60	6.30	13.10	11.90	13.10
CORRECTED WEIGHT FLOW	.03516	.03510	.03504	.03560	.03521	.03523	.03522
SMOKE NUMBER	6.00	3.60	4.80	11.30	19.00	20.20	19.00
CORRECTED WEIGHT FLOW	.04923	.04914	.04905	.04993	.04936	.04932	.04932
SMOKE NUMBER	6.50	6.50	7.10	15.50	23.60	22.60	21.40
SMOKE NUMBER AT WA=0.023	5.00	3.20	4.20	9.70	15.10	15.10	16.20

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-7-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 2
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.028	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.056	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.084	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 2 DATE: 11-7-75 TIME: BARO PRESS.: 28.840 IN. HGA.
AMBIENT AIR TEMP.: 19.00 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	36	37	38	39	40	41	42
ACTUAL POWER SETTING, HORSEPOWER	32.5	48.5	68.8	196.3	458.3	588.5	653.8
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.98	7.41	10.52	29.99	78.18	98.11	99.78
N1 SPEED, RPM	27570.00	27530.00	27520.00	41760.00	41740.00	41750.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	103.0	114.0	129.0	260.0	350.0	398.0	426.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	2.9	8.0	8.0	8.0	8.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	18.00	20.00	19.00	20.00	19.00	18.00	20.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.11	14.11	14.11	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	50.59	50.59	50.59	140.32	148.58	152.75	154.72
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	302.00	302.00	304.00	623.00	630.00	634.00	637.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	812.0	870.0	957.0	1074.0	1275.0	1373.0	1419.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.15	14.15	14.01	14.03	14.07	14.09
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	66.300	51.680	36.000	7.500	4.500	5.400	7.500
CARBON MONOXIDE (CO), PPMV	228.418	215.693	192.874	63.974	32.033	27.139	22.675
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.700	24.000	29.000	55.400	85.000	97.500	106.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.863	2.042	2.311	1.899	2.555	2.929	3.138
NITRIC OXIDE (NO), PPMV	13.200	17.500	24.300	42.600	77.500	94.500	108.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.022	2.862	1.778	.451	.282	.211	.275
CARBON MONOXIDE (CO)	23.391	20.929	16.586	6.737	2.513	1.858	1.453
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.783	3.825	4.096	9.583	10.954	10.964	11.235
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.414	.326	.228	.117	.071	.084	.117
CARBON MONOXIDE (CO)	2.409	2.386	2.140	1.752	.668	.739	.619
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.390	.436	.528	2.492	3.834	4.364	4.786
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.10	99.26	99.45	99.80	99.92	99.94	99.94
F/A (EMISSIONS,CALC)	.0090	.0099	.0111	.0391	.0122	.0139	.0149

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-7-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 2
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	103.091	103.091	260.050	397.492	425.753	
FUEL MASS, LB	12.027	32.645	19.504	16.562	3.548	84.286
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.011	4.011	.452	.208	.267	2.282
RATE, LB HC/HR	.413	.413	.117	.083	.114	.345
MASS, LB HC	.048	.131	.009	.003	.001	.192
MASS, PERCENT OF TOTAL CYCLE	25.1	68.1	4.6	1.8	.5	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.028
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	23.378	23.378	6.736	1.832	1.317	14.365
RATE, LB CO/HR	2.410	2.410	1.752	.728	.561	2.169
MASS, LB CO	.281	.763	.131	.038	.005	1.211
MASS, PERCENT OF TOTAL CYCLE	23.2	63.0	10.9	2.5	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.856
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.783	3.783	9.585	10.956	11.218	6.848
RATE, LB NOX/HR	.390	.390	2.492	4.355	4.776	1.034
MASS, LB NOX	.045	.123	.167	.181	.048	.577
MASS, PERCENT OF TOTAL CYCLE	7.9	21.4	32.4	31.4	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.884

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	23.4	34.4
HC (IDLE)	4.8	6.7
NOX (TAKEOFF)	11.2	23.5

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04801 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 2
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 19. REL HUM= 100.00 SPEC HUM= .002888
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 308.0 FLO,L/H= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	36	37	38	39	40	41	42
PERCENT MAX. CORRECTED POWER	5.0	7.4	10.5	30.0	70.1	90.1	99.8
CORRECTED SHAFT HP	35.2	52.3	74.3	211.8	494.9	636.2	704.4
MEASURED SHAFT HP	32.5	48.5	68.8	196.3	458.3	588.5	653.8
SHAFT SPEED, N1, RPM	27570.0	27530.0	27520.0	41760.0	41740.0	41750.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	18.0	20.0	19.0	20.0	19.0	18.0	20.0
COMPRESSOR DSCHG. PRES.,PSIA	50.6	50.6	50.6	140.3	148.6	152.8	154.7
COMPRESSOR DSCHG. TEMP,DEG F	302.0	302.0	304.0	623.0	630.0	634.0	637.0
TURB INTERSTAGE TEMP., DEG.F	812.0	878.0	957.0	1074.0	1275.0	1373.0	1419.0
CORR BELMTH FLOW, LB/SEC	3.03	2.97	2.90	7.95	7.95	7.98	8.01
FA RATIO BASED ON BELLMTH.	.0094	.0106	.0123	.0091	.0122	.0138	.0147
MEASURED FUEL FLOW, LB/HR	103.9	114.8	129.0	260.0	350.0	398.0	426.0
FA RATIO CALC. FROM EMISSION	.0098	.0099	.0111	.0091	.0122	.0139	.0149
EQUIVALENCE RATIO	.132	.145	.163	.133	.179	.204	.218
LOADING W/P**N/V/E(T/540)	.329	.321	.315	.080	.071	.068	.066
COMB EFFIC FROM EMISSIONS	99.097	99.257	99.455	99.802	99.923	99.938	99.942

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.86	2.04	2.31	1.90	2.56	2.93	3.13
LB. CO2 PER LB. OF FUEL	3.11	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	319.9	354.9	402.9	817.0	1102.3	1253.9	1342.3
CARBON MONOXIDE							
PPM BY VOLUME, WET	220.4	215.7	192.9	64.8	32.8	27.1	22.7
LB. PER 1000 LB. OF FUEL	23.391	20.929	16.586	6.737	2.513	1.858	1.453
WEIGHT FLOW, LB./HR.	2.409	2.386	2.140	1.752	.880	.739	.619
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	66.3	51.6	36.8	7.5	4.5	5.4	7.5
LB. PER 1000 LB. OF FUEL	4.022	2.862	1.778	.451	.282	.211	.275
WEIGHT FLOW, LB./HR.	.414	.326	.228	.117	.071	.084	.117
RATIO LB HC/LB CO	.1719	.1367	.1067	.0670	.0803	.1137	.1891
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.2	17.5	24.3	42.6	77.5	94.5	100.7
LB. PER 1000 LB. OF FUEL	2.331	2.789	3.433	7.369	9.987	10.627	10.603
WEIGHT FLOW, LB./HR.	.237	.318	.443	1.916	3.495	4.230	4.517
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	8.5	6.5	4.7	12.8	7.5	3.8	6.8
LB. PER 1000 LB. OF FUEL	1.482	1.036	.664	2.214	.966	.337	.631
WEIGHT FLOW, LB./HR.	.153	.118	.086	.576	.338	.134	.269
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.7	24.0	29.0	55.4	85.0	97.5	106.7
LB. PER 1000 LB. OF FUEL	3.783	3.825	4.096	9.583	10.954	10.964	11.235
WEIGHT FLOW, LB./HR.	.390	.436	.528	2.492	3.834	4.364	4.786
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00701	.00705	.00706	.00712	.00713	.00713	.00713
SMOKE NUMBER	2.40	2.40	0.00	2.40	4.80	4.80	3.60
CORRECTED WEIGHT FLOW	.02102	.02114	.02117	.02135	.02139	.02139	.02139
SMOKE NUMBER	4.80	3.60	1.20	7.10	13.10	10.70	11.90
CORRECTED WEIGHT FLOW	.03510	.03524	.03528	.03558	.03564	.03564	.03564
SMOKE NUMBER	8.30	4.80	3.60	10.70	20.20	17.90	15.50
CORRECTED WEIGHT FLOW	.04914	.04942	.04948	.04981	.04990	.04990	.04990
SMOKE NUMBER	7.10	6.00	7.10	15.50	25.00	21.40	19.00
SMOKE NUMBER AT WA=0.023	5.70	4.20	3.00	9.00	15.90	13.00	12.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 3
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.503	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.236	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.479	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.1	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 3 DATE: 11-4-75 TIME: BARO PRESS.: 28.860 IN. HGA.
AMBIENT AIR TEMP.: 39.00 DEG. F RELATIVE HUMIDITY: 40.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 360.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	43	44	45	46	47	48	49
ACTUAL POWER SETTING, HORSEPOWER	33.8	49.9	69.6	280.8	469.8	602.1	668.8
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.85	7.49	10.44	30.10	70.42	90.26	100.86
N1 SPEED, RPM	27510.00	27520.00	27540.00	41750.00	41750.00	41750.00	41720.00
FUEL FLOW (MEAS.) LB./HR.	107.0	117.0	138.0	268.0	356.0	400.0	428.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	6.0	8.0	8.0	7.9
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	40.00	38.00	38.00	38.00	38.00	38.00	40.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.36	49.98	50.44	138.65	146.46	150.29	151.52
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	315.00	313.00	315.00	640.00	649.00	655.00	659.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	841.0	896.0	978.0	1070.0	1270.0	1389.0	1430.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.16	14.16	14.06	14.07	14.10	14.12
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	78.000	42.000	32.400	7.200	2.400	.900	1.200
CARBON MONOXIDE (CO), PPMV	218.340	192.413	170.536	62.294	29.175	22.675	19.846
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.000	25.000	30.000	57.500	98.500	107.500	116.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.954	2.183	2.371	1.913	2.613	2.963	3.195
NITRIC OXIDE (NO), PPMV	14.000	16.000	24.500	41.300	63.000	101.500	112.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.513	2.266	1.554	.438	.185	.035	.043
CARBON MONOXIDE (CO)	21.595	18.162	14.315	6.514	2.239	1.535	1.246
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.658	3.876	4.136	9.876	11.487	11.954	12.248
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.483	.265	.282	.112	.037	.014	.018
CARBON MONOXIDE (CO)	2.311	2.125	1.861	1.694	.797	.614	.533
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.391	.454	.538	2.568	4.861	4.782	5.242
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.18	99.37	99.53	99.81	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0095	.0101	.0114	.0092	.0124	.0141	.0152

•• EPA CYCLE EMISSIONS COMPUTATION SUMMARY ••

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M S/N: P34091 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 2
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.119	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	106.778	106.778	259.255	398.795	428.864	
FUEL MASS, LB	12.457	33.813	19.444	16.616	3.567	85.898
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.989	4.989	.436	.078	.023	2.991
RATE, LB HC/HR	.490	.490	.118	.031	.010	.399
MASS, LB HC	.057	.155	.009	.001	.000	.223
MASS, PERCENT OF TOTAL CYCLE	29.7	69.7	4.0	.6	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.503
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.672	21.672	6.586	1.499	1.266	13.498
RATE, LB CO/HR	2.314	2.314	1.687	.598	.543	2.075
MASS, LB CO	.270	.733	.127	.029	.005	1.159
MASS, PERCENT OF TOTAL CYCLE	23.3	63.2	10.9	2.2	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						10.236
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.691	3.691	9.847	11.929	12.296	7.911
RATE, LB NOX/HR	.398	.398	2.553	4.755	5.246	1.879
MASS, LB NOX	.049	.123	.191	.198	.044	.602
MASS, PERCENT OF TOTAL CYCLE	7.6	28.5	31.8	32.9	7.3	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.479

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	21.7	33.4
HC (IDLE)	4.6	4.5
NOX (TAKEOFF)	12.3	23.3

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84801 COMB P/N= 869882-4 FUEL= AV. KERO. TEST NO.= 3
BAT SMP= 786. RA EGT,F= 1650. BAT SPD= 41730. DEN PT,F= 19. RE. HUM= 40.00 SPEC HUM= .002000
FUEL H/C= 1.9288 STDI F/A= .06822 L H V= 18478. S LN T,F= 388.0 FLO.L/HR= 14.160 SL TIM,S= 0.5000

DATA POINT NUMBER	43	44	45	46	47	48	49
PERCENT MAX. CORRECTED POWER	5.1	7.3	18.4	38.1	78.4	98.3	100.1
CORRECTED SHAFT HP	35.7	52.9	73.7	212.5	497.2	637.3	786.4
MEASURED SHAFT HP	33.8	49.9	69.6	205.8	469.8	602.1	668.8
SHAFT SPEED, N1, RPM	27518.8	27528.8	27540.8	41758.8	41758.8	41758.8	41728.8
COMPRESSOR INLET TEMP.,DEG.F	40.0	39.8	39.8	38.8	38.8	38.8	40.8
COMPRESSOR DSCHG. PRES.,PSIA	49.4	49.9	50.4	138.7	146.5	150.3	151.5
COMPRESSOR DSCHG. TEMP.,DEG F	315.8	313.8	315.8	648.8	649.8	655.8	659.8
TURB INTERSTAGE TEMP., DEG.F	841.8	896.8	970.8	1870.8	1278.8	1309.8	1438.8
CORR DELWTH FLOW, LB/SEC	2.98	2.94	2.98	7.99	7.97	7.97	7.95
FA RATIO BASED ON DELLWTH.	.0101	.0117	.0127	.0092	.0126	.0142	.0152
MEASURED FUEL FLOW, LB/HR	107.8	117.8	128.8	268.8	356.8	408.8	428.8
FA RATIO CALC. FROM EMISSION	.0095	.0101	.0114	.0092	.0124	.0141	.0152
EQUIVALENCE RATIO	.139	.149	.167	.134	.182	.206	.222
LOADING M/P**N/V/E4T/S4T)	.322	.313	.302	.878	.869	.865	.864
COMB EFFIC FROM EMISSIONS	99.846	99.874	99.927	99.889	99.938	99.961	99.967

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.95	2.18	2.37	1.91	2.61	2.96	3.19
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	332.9	369.8	406.9	837.1	1121.9	1268.6	1349.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	213.8	192.4	178.9	62.8	29.2	22.7	19.6
LB. PER 1000 LB. OF FUEL	21.595	18.162	14.819	6.514	2.289	1.935	1.744
WEIGHT FLOW, LB./HR.	2.311	2.125	1.861	1.694	.797	.614	.533
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	78.8	62.8	32.4	7.2	2.4	.9	1.2
LB. PER 1000 LB. OF FUEL	4.513	2.266	1.554	.438	.185	.835	.843
WEIGHT FLOW, LB./HR.	.483	.269	.262	.112	.037	.014	.010
RATIO LB HC/LB CO	.2098	.1248	.1886	.0661	.0478	.0227	.0346
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.8	18.8	24.5	41.3	83.8	101.5	112.5
LB. PER 1000 LB. OF FUEL	2.461	2.915	3.378	7.094	10.462	11.287	11.683
WEIGHT FLOW, LB./HR.	.263	.341	.439	1.844	3.724	4.919	4.986
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	7.2	6.2	5.5	10.2	7.5	6.8	6.3
LB. PER 1000 LB. OF FUEL	1.197	.961	.758	2.783	.945	.667	.645
WEIGHT FLOW, LB./HR.	.128	.112	.099	.723	.337	.267	.270
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.0	25.0	30.0	51.5	90.5	107.5	118.8
LB. PER 1000 LB. OF FUEL	3.658	3.876	4.136	9.876	11.407	11.954	12.328
WEIGHT FLOW, LB./HR.	.391	.454	.538	2.568	4.061	4.782	5.242
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00692	.00693	.00694	.00697	.00703	.00704	.00709
SMOKE NUMBER	2.48	1.28	2.48	5.98	7.18	5.98	4.78
CORRECTED WEIGHT FLOW	.02075	.02078	.02082	.02091	.02109	.02112	.02114
SMOKE NUMBER	2.48	2.48	2.48	8.28	12.98	11.88	10.68
CORRECTED WEIGHT FLOW	.03458	.03478	.03469	.03485	.03514	.03527	.03527
SMOKE NUMBER	4.78	5.98	3.58	12.98	28.88	17.68	17.68
CORRECTED WEIGHT FLOW	.04841	.04858	.04857	.04887	.04926	.04938	.04938
SMOKE NUMBER	8.28	9.98	7.18	17.68	23.58	23.58	22.48
SMOKE NUMBER AT WA=0.028	4.38	8.98	3.98	11.38	16.18	14.98	14.88

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

AIRESEARCH EMISSION TEST SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX .ACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M S/N: P84881 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 3
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973

HYDROCARBONS (CH AS CH4)	4.588	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.984	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.986	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	14.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE. 78 PERCENT RATED POWER

PART-IDLE SETTING: 0.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

ENGINE DESCRIPTION

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869882-4 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:
USER: MODEL NO.:
ENGINE INSTALLATION POSITION:

OPERATIONAL TEST DATA SUMMARY

GASEOUS EMISSION TEST NO.: 3 DATE: 11-4-75 TIME:
AMBIENT AIR TEMP.: 39.00 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT BARO PRESS.: 28.040 IN. HGA.
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
SAMPLE LINE *** TEMP.: 388.00 DEG. F. FLOWRATE: 14.14 LITERS/MIN. OXIDES OF NITROGEN (NOX): 0.0 PPMV
TRANSPORT TIME: 6.58 SEC. LENGTH: 50.00 FT.

COMPUTED EMISSIONS

TEST CONDITION	90	91	92	93	94	95	96
ACTUAL POWER SETTING, HORSEPOWER	33.3	58.9	66.3	282.1	467.2	682.9	671.0
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.89	7.47	9.97	38.32	69.95	98.36	188.65
N1 SPEED, RPM	27568.00	27538.00	27550.00	41770.00	41750.00	41728.00	41760.00
FUEL FLOW (MEAS.) LB./HR.	107.0	117.0	127.0	256.0	348.0	408.0	426.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.1	2.9	2.9	5.0	6.0	8.0	8.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	39.00	42.00	36.00	38.00	40.00	39.00	40.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.61	49.61	50.54	138.75	145.38	158.05	151.28
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	314.00	317.00	314.00	441.00	453.00	457.00	461.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	639.0	918.0	963.0	1983.0	1298.0	1396.0	1475.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.15	14.15	14.15	14.85	14.85	14.18	14.11
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	99.000	99.000	33.000	7.500	.900	2.100	2.100
CARBON MONOXIDE (CO), PPMV	225.642	283.055	188.946	55.779	26.767	19.066	19.442
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.000	26.500	29.900	59.000	89.500	105.000	115.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.649	2.163	2.297	1.884	2.688	3.029	3.177
NITRIC OXIDE (NO), PPMV	13.400	20.400	24.298	45.000	80.000	102.000	107.900
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	6.036	2.991	1.663	.455	.060	.060	.076
CARBON MONOXIDE (CO)	20.070	19.109	19.671	8.362	2.212	1.310	1.220
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	8.020	6.184	6.253	10.201	11.305	11.457	11.927
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.646	.356	.211	.117	.014	.032	.032
CARBON MONOXIDE (CO)	2.575	2.268	1.998	1.636	.770	.527	.523
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.489	.488	.548	2.653	3.934	4.583	5.081
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.98	99.29	99.49	99.81	99.94	99.96	99.96
F/A (EMISSIONS,CALC)	.0096	.0102	.0110	.0090	.0124	.0144	.0151

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED AEG V3B N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P84081 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 756.8 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 8
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18479. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	107.012	107.012	255.456	398.043	427.414	
FUEL MASS, LB	12.485	33.887	19.159	16.585	3.562	85.678
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	6.031	6.031	.587	.122	.027	3.402
RATE, LB HC/HR	.645	.645	.129	.049	.012	.522
MASS, LB HC	.075	.204	.018	.002	.000	.292
MASS, PERCENT OF TOTAL CYCLE	25.8	70.1	3.8	.7	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.588
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	24.062	24.062	6.396	1.321	1.236	14.761
RATE, LB CO/HR	2.575	2.575	1.634	.526	.528	2.265
MASS, LB CO	.300	.815	.123	.022	.004	1.265
MASS, PERCENT OF TOTAL CYCLE	23.8	64.5	9.7	1.7	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.984
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.828	3.828	10.176	11.489	11.984	7.850
RATE, LB NOX/HR	.409	.409	2.599	4.541	5.122	1.862
MASS, LB NOX	.048	.129	.195	.189	.043	.604
MASS, PERCENT OF TOTAL CYCLE	7.9	21.4	32.3	31.3	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.586

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	24.1	33.5
HC (IDLE)	6.8	6.5
NOX (TAKEOFF)	12.8	23.1

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04801 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 3
SAT SHP= 786. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 19. REL HUM= 40.00 SPEC HUM= .002888
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LH T,F= 388.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	90	91	92	93	94	95	96
PERCENT MAX. CORRECTED POWER	5.8	7.5	10.8	30.3	70.0	90.4	100.5
CORRECTED SHAFT HP	35.3	52.7	78.4	214.1	493.9	637.9	709.2
MEASURED SHAFT HP	33.3	50.0	66.3	202.1	467.2	602.9	671.0
SHAFT SPEED, N1, RPM	27560.0	27530.0	27550.0	41770.0	41750.0	41720.0	41760.0
COMPRESSOR INLET TEMP.,DEG.F	39.0	42.0	36.0	38.0	40.0	39.0	40.0
COMPRESSOR DSCHG. PRES.,PSIA	49.6	49.6	50.5	138.8	145.4	150.0	151.3
COMPRESSOR DSCHG. TEMP,DEG F	314.0	317.0	314.0	641.0	653.0	657.0	661.0
TURB INTERSTAGE TEMP., DEG.F	839.0	916.0	963.0	1083.0	1298.0	1396.0	1475.0
CORR BELMTH FLOW, LB/SEC	3.10	2.93	2.93	8.02	7.96	7.95	7.96
FA RATIO BASED ON BELLMTH.	.0097	.0113	.0122	.0091	.0124	.0142	.0151
MEASURED FUEL FLOW, LB/HR	187.0	117.0	127.0	258.0	348.0	408.0	426.0
FA RATIO CALC. FROM EMISSION	.0090	.0102	.0110	.0090	.0124	.0144	.0151
EQUIVALENCE RATIO	.132	.149	.162	.132	.182	.210	.221
LOADING W/P**N/V/E(T/540)	.333	.312	.305	.078	.069	.065	.064
COMB EFFIC FROM EMISSIONS	98.984	99.287	99.485	99.811	99.944	99.962	99.964

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.85	2.10	2.38	1.89	2.61	3.02	3.16
LB. CO2 PER LB. OF FUEL	3.10	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	331.7	364.5	396.9	810.9	1096.4	1260.7	1342.7
CARBON MONOXIDE							
PPM BY VOLUME, WET	225.6	203.1	181.0	99.8	20.8	19.8	19.4
LB. PER 1000 LB. OF FUEL	24.070	19.145	15.671	6.342	2.212	1.318	1.228
WEIGHT FLOW, LB./HR.	2.575	2.240	1.990	1.636	.770	.527	.523
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	99.0	55.5	33.6	7.5	.9	2.1	2.1
LB. PER 1000 LB. OF FUEL	6.836	2.991	1.663	.455	.048	.088	.076
WEIGHT FLOW, LB./HR.	.646	.358	.211	.117	.014	.032	.032
RATIO LB HC/LB CO	.2588	.1562	.1061	.0717	.0179	.0605	.0617
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.4	20.4	24.2	45.8	80.8	102.8	107.5
LB. PER 1000 LB. OF FUEL	2.348	3.159	3.442	7.842	10.105	11.129	11.149
WEIGHT FLOW, LB./HR.	.251	.378	.437	2.023	3.517	4.452	4.758
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	8.4	6.1	5.7	14.8	9.5	3.8	7.5
LB. PER 1000 LB. OF FUEL	1.472	.945	.811	2.440	1.208	.327	.778
WEIGHT FLOW, LB./HR.	.157	.111	.103	.629	.418	.131	.331
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.8	26.5	29.9	59.8	89.5	105.8	115.0
LB. PER 1000 LB. OF FUEL	3.820	4.104	4.253	10.281	11.305	11.457	11.927
WEIGHT FLOW, LB./HR.	.409	.488	.540	2.653	3.934	4.583	5.081
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.08704	.08706	.08705	.08703	.08703	.08701	.08700
SMOKE NUMBER	2.40	0.00	3.50	4.70	4.70	5.90	3.50
CORRECTED WEIGHT FLOW	.02111	.02119	.02114	.02109	.02109	.02104	.02101
SMOKE NUMBER	3.50	3.50	2.40	9.40	11.80	11.80	10.60
CORRECTED WEIGHT FLOW	.03519	.03532	.03524	.03521	.03514	.03507	.03502
SMOKE NUMBER	7.10	5.90	7.10	11.80	10.60	17.60	16.50
CORRECTED WEIGHT FLOW	.04927	.04945	.04933	.04929	.04920	.04910	.04902
SMOKE NUMBER	7.10	7.10	7.10	17.69	23.58	22.48	18.80
SMOKE NUMBER AT MA=0.823	5.10	4.20	5.00	11.00	14.90	14.60	12.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

AIRESEARCH EMISSION TEST SUMMARY

ENG MFG : AIRESEARCH   TEST FACIL : PHX LACC2   INSTR DESCRIP : FED REG V38 N136   CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M   S/N: P04001   ENGINE TYPE(CLASS): TURBOPROP   CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS   TEST NO: 3
FUEL: ASTM D1655-73   ATOMIC H/C RATIO: 1.920   LHV: 18470. BTU/LB   ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.626	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.189	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.471	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	14.5	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

ENGINE DESCRIPTION

COMB TYPE: REVERSE FLOW ANNULAR   P/N: 869082-4   SUR/VOL: 1.260   FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR   TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:   MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

OPERATIONAL TEST DATA SUMMARY

GASEOUS EMISSION TEST NO.: 3   DATE: 11-4-75   TIME: BARO PRESS.: 28.860 IN. HGA.
AMBIENT AIR TEMP.: 39.00 DEG. F   RELATIVE HUMIDITY: 40.00 PERCENT   SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY   HYDROCARBONS (HC): 0.0 PPMC   CARBON MONOXIDE (CO): 0.0 PPMV   OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F.   FLOWRATE: 14.16 LITERS/MIN.   TRANSPORT TIME: 6.50 SEC.   LENGTH: 50.00 FT.

COMPUTED EMISSIONS

TEST CONDITION	57	58	59	60	61	62	63
ACTUAL POWER SETTING, HORSEPOWER	34.2	49.5	67.7	206.1	465.0	603.3	669.6
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.11	7.41	10.12	30.84	69.69	90.26	100.10
N1 SPEED, RPM	27940.00	27970.00	27970.00	41760.00	41760.00	41730.00	41770.00
FUEL FLOW (MEAS.) LB./HR.	106.0	113.0	125.0	294.0	342.0	389.0	420.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	6.0	7.9	7.9	8.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	40.00	40.00	41.00	40.00	40.00	40.00	40.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.12	49.61	49.95	137.77	145.14	148.02	150.00
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	317.00	319.00	321.00	646.00	655.00	659.00	664.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	846.0	900.0	985.0	1094.0	1295.0	1419.0	1474.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.16	14.16	14.06	14.06	14.11	14.12
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	60.000	54.000	30.600	6.900	2.700	1.500	1.500
CARBON MONOXIDE (CO), PPMV	200.260	197.027	174.153	61.036	20.767	21.065	17.031
TOTAL OXIDES OF NITROGEN (NOX), PPMV	23.000	25.500	30.200	61.500	92.750	110.500	120.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.917	2.127	2.336	1.954	2.639	3.003	3.231
NITRIC OXIDE (NO), PPMV	16.300	19.300	24.500	40.200	85.250	104.500	113.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.542	2.879	1.490	.404	.117	.056	.053
CARBON MONOXIDE (CO)	20.687	18.378	14.834	6.249	2.185	1.422	1.107
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.903	3.987	4.225	10.342	11.574	11.800	12.266
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.376	.325	.186	.103	.040	.022	.022
CARBON MONOXIDE (CO)	2.193	2.077	1.854	1.587	.747	.553	.465
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.414	.441	.528	2.627	3.958	4.593	5.152
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.28	99.32	99.52	99.82	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0093	.0103	.0112	.0094	.0126	.0146	.0153

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-79
MODEL NO.: TPE331-6-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 3
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	32.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	185.750	185.750	249.396	388.155	419.509	
FUEL MASS, LB	12.336	33.488	16.785	16.173	3.496	84.199
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.552	3.552	.187	.013	.119	1.982
RATE, LB HC/HR	.376	.376	.047	.005	.066	.299
MASS, LB HC	.044	.119	.004	.000	.000	.167
MASS, PERCENT OF TOTAL CYCLE	26.3	71.3	2.1	.1	.2	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.626
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	28.763	28.763	6.112	1.373	1.189	12.971
RATE, LB CO/HR	2.196	2.196	1.524	.533	.499	1.956
MASS, LB CO	.256	.699	.114	.022	.006	1.092
MASS, PERCENT OF TOTAL CYCLE	23.5	63.7	10.5	2.0	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.189
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.904	3.908	10.117	11.781	12.279	7.147
RATE, LB NOX/HR	.413	.413	2.523	4.573	5.151	1.078
MASS, LB NOX	.048	.131	.189	.191	.063	.602
MASS, PERCENT OF TOTAL CYCLE	8.0	21.7	31.4	31.7	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.471

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.6
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	28.8	34.1
HC (IDLE)	3.6	4.7
NOX (TAKEOFF)	12.8	23.7

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 3
RAT SHP= 786. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 19. REL HUM= 48.00 SPEC HUM= .002000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	57	58	59	60	61	62	63
PERCENT MAX. CORRECTED POWER	5.1	7.4	10.1	38.8	69.7	98.3	108.2
CORRECTED SHAFT HP	36.1	52.3	71.5	217.7	492.8	637.3	707.3
MEASURED SHAFT HP	34.2	49.5	67.7	206.1	465.8	603.3	669.6
SHAFT SPEED, N1, RPM	27540.0	27570.0	27570.0	41760.0	41760.0	41730.0	41770.0
COMPRESSOR INLET TEMP.,DEG.F	40.0	40.0	41.0	40.0	40.0	40.0	40.0
COMPRESSOR DSCHG. PRES.,PSIA	49.1	49.6	50.0	137.0	145.1	148.0	150.9
COMPRESSOR DSCHG. TEMP,DEG F	317.0	319.0	321.0	646.0	655.0	659.0	664.0
TURB INTERSTAGE TEMP., DEG.F	846.0	908.0	985.0	1094.0	1295.0	1419.0	1474.0
CORR BELMTH FLOW, LB/SEC	3.00	2.93	2.89	7.96	7.94	7.93	7.96
FA RATIO BASED ON BELLMTH.	.0100	.0109	.0123	.0090	.0122	.0139	.0149
MEASURED FUEL FLOW, LB/HR	106.8	117.0	125.8	254.8	342.8	389.8	420.8
FA RATIO CALC. FROM EMISSION	.0093	.0103	.0112	.0094	.0126	.0146	.0153
EQUIVALENCE RATIO	.136	.150	.165	.137	.184	.215	.225
LOADING W/P**N/V/E(T/540)	.325	.311	.302	.877	.869	.866	.864
COMB EFFIC FROM EMISSIONS	99.203	99.315	99.520	99.818	99.938	99.962	99.969

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.92	2.13	2.34	1.99	2.64	3.08	3.23
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	329.9	362.3	390.8	798.4	1077.4	1226.8	1323.9
CARBON MONOXIDE							
PPM BY VOLUME, WET	208.3	197.8	174.2	61.8	28.8	21.9	17.8
LB. PER 1000 LB. OF FUEL	28.687	18.378	14.834	6.249	2.185	1.422	1.107
WEIGHT FLOW, LB./HR.	2.193	2.077	1.854	1.587	.747	.553	.465
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	68.8	54.8	38.6	6.9	2.7	1.5	1.5
LB. PER 1000 LB. OF FUEL	3.542	2.879	1.498	.484	.117	.056	.053
WEIGHT FLOW, LB./HR.	.376	.325	.186	.183	.040	.022	.022
RATIO LB HC/LB CO	.1712	.1567	.1004	.0646	.0536	.0392	.0481
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	16.8	19.3	24.5	48.2	85.2	104.5	113.7
LB. PER 1000 LB. OF FUEL	2.766	2.957	3.428	6.186	10.638	11.167	11.603
WEIGHT FLOW, LB./HR.	.293	.334	.428	2.359	3.638	4.344	4.873
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.7	6.2	5.7	13.3	7.5	6.8	6.5
LB. PER 1000 LB. OF FUEL	1.137	.950	.798	2.237	.936	.641	.663
WEIGHT FLOW, LB./HR.	.121	.107	.100	.568	.320	.249	.278
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.8	25.5	30.2	61.5	92.7	110.5	120.2
LB. PER 1000 LB. OF FUEL	3.903	3.907	4.225	10.342	11.574	11.808	12.266
WEIGHT FLOW, LB./HR.	.414	.441	.526	2.627	3.958	4.593	5.152
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00698	.00708	.00708	.00708	.00708	.00708	.00708
SMOKE NUMBER	3.50	3.50	4.70	3.50	3.50	5.90	3.50
CORRECTED WEIGHT FLOW	.02095	.02180	.02099	.02124	.02124	.02124	.02124
SMOKE NUMBER	3.50	3.50	5.90	8.20	14.10	10.60	9.40
CORRECTED WEIGHT FLOW	.03492	.03588	.03499	.03540	.03540	.03540	.03540
SMOKE NUMBER	7.10	4.70	5.90	12.90	16.80	14.10	15.30
CORRECTED WEIGHT FLOW	.04897	.04988	.04899	.04956	.04956	.04947	.04956
SMOKE NUMBER	5.90	5.90	7.10	17.60	21.20	17.60	16.80
SMOKE NUMBER AT MA=0.823	5.80	4.40	5.90	10.70	14.50	12.10	11.90

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAGG2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-9-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 4
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.494	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.794	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.872	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 9.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 4 DATE: 11-4-75 TIME: BARO PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 39.00 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 388.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	64	65	66	67	68	69	70
ACTUAL POWER SETTING, HORSEPOWER	35.1	58.5	66.9	284.1	464.5	682.1	666.9
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.26	7.56	10.03	30.55	69.52	98.12	100.12
N1 SPEED, RPM	27530.00	27540.00	27560.00	41760.00	41750.00	41730.00	41760.00
FUEL FLOW (MEAS.) LB./HR.	106.0	112.0	124.0	254.0	344.0	394.0	421.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	0.0	0.0	0.0	0.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	43.00	43.00	41.00	43.00	43.00	43.00	40.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.13	14.13	14.13	14.13	14.13	14.13	14.13
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.72	49.75	50.28	137.28	144.65	148.92	151.52
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	316.00	316.00	316.00	635.00	644.00	650.00	649.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	858.0	900.0	965.0	1869.0	1272.0	1386.0	1436.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.11	14.11	14.11	14.00	14.01	14.05	14.07
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	58.500	55.500	33.000	6.000	2.100	1.200	1.200
CARBON MONOXIDE (CO), PPMV	198.878	194.717	176.420	56.814	23.485	19.846	16.624
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.400	25.580	29.880	56.900	85.800	108.800	109.580
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.954	2.179	2.401	1.977	2.634	3.088	3.237
NITRIC OXIDE (NO), PPMV	16.868	19.780	23.908	44.888	78.888	95.758	105.888
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.391	2.895	1.563	.347	.091	.846	.843
CARBON MONOXIDE (CO)	28.166	17.768	14.620	5.670	1.788	1.323	1.838
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	5.731	5.822	5.948	9.461	10.631	10.953	11.149
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.359	.324	.194	.888	.831	.818	.818
CARBON MONOXIDE (CO)	2.138	1.998	1.813	1.448	.615	.521	.434
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.395	.428	.498	2.483	3.657	4.315	4.694
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.23	99.33	99.52	99.84	99.95	99.96	99.97
F/A (EMISSIONS,CALC)	.0095	.0105	.0115	.0095	.0125	.0143	.0154

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 4
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.700	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.116	11.176	15.805	26.475	5.883	63.540
FUEL FLOW, LB/HR	185.660	185.660	251.673	393.791	428.488	
FUEL MASS, LB	12.329	33.465	10.876	16.488	3.583	84.581
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.372	3.372	.178	.822	.892	1.674
RATE, LB HC/HR	.356	.356	.045	.089	.039	.284
MASS, LB HC	.042	.113	.008	.008	.003	.158
MASS, PERCENT OF TOTAL CYCLE	26.2	71.2	2.1	.2	.2	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.494
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	28.366	28.366	5.651	1.311	1.066	12.586
RATE, LB CO/HR	2.152	2.152	1.422	.516	.448	1.987
MASS, LB CO	.251	.682	.107	.822	.004	1.065
MASS, PERCENT OF TOTAL CYCLE	23.6	64.0	10.0	2.0	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.754
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.715	3.715	9.271	18.934	11.181	6.665
RATE, LB NOX/HR	.393	.393	2.333	4.306	4.701	1.819
MASS, LB NOX	.046	.124	.175	.179	.039	.564
MASS, PERCENT OF TOTAL CYCLE	8.1	22.1	31.0	31.8	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.872

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.6
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	28.4	34.3
HC (IDLE)	3.4	6.7
NOX (TAKEOFF)	11.2	24.3

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 4
RAT SHP= 706. RA EGT,F= 1050. RAT SPD= 41730. OEM PT,F= 40. REL HUM= 100.00 SPEC HUM= .005000
FUEL H/C= 1.9260 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	64	65	66	67	68	69	70
PERCENT MAX. CORRECTED POWER	5.3	7.6	18.0	38.6	69.5	98.1	100.1
CORRECTED SHAFT HP	37.1	53.3	78.8	215.7	490.8	636.2	706.9
MEASURED SHAFT HP	35.1	50.5	66.9	204.1	464.5	602.1	666.9
SHAFT SPEED, N1, RPM	27530.0	27540.0	27560.0	41760.0	41750.0	41730.0	41760.0
COMPRESSOR INLET TEMP.,DEG.F	43.8	43.8	41.8	43.8	43.8	43.8	40.8
COMPRESSOR DSCHG. PRES.,PSIA	48.7	49.6	50.2	137.3	144.6	148.9	151.5
COMPRESSOR DSCHG. TEMP,DEG F	316.8	316.8	316.8	635.8	644.0	650.8	649.8
TURB INTERSTAGE TEMP., DEG.F	650.0	908.8	965.0	1089.0	1272.0	1388.0	1436.0
CORR BELLMTH FLOW, LB/SEC	2.96	2.94	2.94	8.01	7.99	7.98	8.01
FA RATIO BASED ON BELLMTH.	.0102	.0108	.0120	.0090	.0123	.0141	.0149
MEASURED FUEL FLOW, LB/HR	106.8	112.8	124.8	254.8	344.8	394.8	421.8
FA RATIO CALC. FROM EMISSION	.0095	.0105	.0115	.0095	.0125	.0143	.0154
EQUIVALENCE RATIO	.139	.154	.169	.139	.184	.218	.225
LOADING W/P**N/V/E(T/540)	.325	.318	.306	.079	.071	.067	.065
COMB EFFIC FROM EMISSIONS	99.228	99.328	99.519	99.836	99.950	99.965	99.972

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.35	2.17	2.48	1.98	2.63	3.01	3.24
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	330.8	349.2	387.7	798.6	1083.9	1241.8	1327.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	198.9	194.7	176.4	56.8	23.5	19.8	16.6
LB. PER 1000 LB. OF FUEL	28.166	17.768	14.628	5.678	1.786	1.323	1.038
WEIGHT FLOW, LB./HR.	2.138	1.998	1.813	1.448	.615	.521	.434
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	58.5	55.5	33.8	6.8	2.1	1.2	1.2
LB. PER 1000 LB. OF FUEL	3.391	2.895	1.563	.347	.091	.046	.043
WEIGHT FLOW, LB./HR.	.359	.324	.194	.088	.031	.018	.018
RATIO LB HC/LB CO	.1681	.1629	.1069	.0612	.0511	.0346	.0413
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	16.8	19.7	23.9	44.8	78.8	95.7	105.8
LB. PER 1000 LB. OF FUEL	2.798	2.953	3.253	7.316	9.855	10.487	10.691
WEIGHT FLOW, LB./HR.	.297	.331	.403	1.858	3.398	4.132	4.501
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.6	5.8	5.1	12.9	6.2	4.3	4.5
LB. PER 1000 LB. OF FUEL	.933	.869	.694	2.145	.775	.465	.458
WEIGHT FLOW, LB./HR.	.099	.097	.086	.545	.267	.183	.193
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.4	25.5	29.8	56.9	85.0	100.0	109.5
LB. PER 1000 LB. OF FUEL	3.731	3.822	3.948	9.461	10.631	10.953	11.149
WEIGHT FLOW, LB./HR.	.395	.428	.498	2.403	3.657	4.315	4.694
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00782	.00784	.00782	.00783	.00785	.00785	.00784
SMOKE NUMBER	2.30	2.30	1.20	4.70	5.80	5.80	4.70
CORRECTED WEIGHT FLOW	.02107	.02111	.02111	.02110	.02114	.02114	.02113
SMOKE NUMBER	3.50	3.50	3.50	7.00	14.00	11.60	9.30
CORRECTED WEIGHT FLOW	.03512	.03518	.03518	.03516	.03516	.03516	.03522
SMOKE NUMBER	4.70	7.00	4.70	14.00	18.60	16.30	15.10
CORRECTED WEIGHT FLOW	.04917	.04926	.04926	.04923	.04923	.04923	.04922
SMOKE NUMBER	8.10	5.80	4.70	15.10	24.40	22.10	20.90
SMOKE NUMBER AT WA=0.023	4.70	4.70	3.50	10.30	15.90	14.10	12.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-5-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 4
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	4.435	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.655	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.792	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.6	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 4 DATE: 11-5-75 TIME: BARO PRESS.: 28.780 IN. HGA.
AMBIENT AIR TEMP.: 39.00 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	71	72	73	74	75	76	77
ACTUAL POWER SETTING, HORSEPOWER	33.5	51.5	67.0	199.7	467.6	604.1	669.2
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.02	7.73	10.06	29.96	70.30	90.73	100.50
N1 SPEED, RPM	27540.00	27530.00	27540.00	41740.00	41740.00	41750.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	106.0	114.5	126.0	256.5	352.0	480.0	425.5
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	2.9	6.0	6.0	6.0	6.0
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	40.00	39.00	39.00	40.00	38.00	39.00	39.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.13	14.13	14.13	14.13	14.13	14.13	14.13
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.85	50.34	50.59	138.26	144.89	150.54	152.26
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	308.00	307.00	309.00	630.00	639.00	644.00	646.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	820.0	895.0	955.0	1065.0	1132.0	1340.0	1420.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	14.02	14.03	14.06	14.08
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	100.500	54.300	40.500	9.000	2.700	1.200	.600
CARBON MONOXIDE (CO), PPMV	233.298	196.102	183.703	65.235	30.399	23.079	22.270
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.600	23.200	27.000	53.988	84.300	98.750	107.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.954	2.141	2.267	1.931	2.645	3.031	3.231
NITRIC OXIDE (NO), PPMV	13.000	17.700	21.300	48.500	78.200	93.750	101.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	5.802	2.876	2.012	.533	.117	.045	.021
CARBON MONOXIDE (CO)	23.565	18.171	15.978	6.755	2.305	1.527	1.363
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.584	3.531	3.656	9.169	18.498	18.733	18.913
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.615	.329	.254	.138	.041	.018	.009
CARBON MONOXIDE (CO)	2.498	2.081	2.012	1.746	.811	.611	.588
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.380	.404	.486	2.378	3.695	4.293	4.643
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.94	99.32	99.45	99.79	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0095	.0103	.0110	.0093	.0126	.0144	.0153

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-5-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 4
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	105.954	105.954	258.692	398.104	424.179	
FUEL MASS, LB	12.361	33.552	19.402	16.588	3.535	85.438
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	5.841	5.841	.523	.180	.146	3.298
RATE, LB HC/HR	.619	.619	.135	.872	.062	.505
MASS, LB HC	.072	.196	.010	.003	.001	.282
MASS, PERCENT OF TOTAL CYCLE	25.6	69.5	3.6	1.1	.2	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.435
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	23.631	23.631	6.730	1.794	1.868	14.620
RATE, LB CO/HR	2.504	2.504	1.741	.714	.453	2.237
MASS, LB CO	.292	.793	.131	.038	.004	1.249
MASS, PERCENT OF TOTAL CYCLE	23.4	63.5	10.5	2.4	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.658
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.587	3.587	9.176	10.683	10.958	6.539
RATE, LB NOX/HR	.380	.380	2.374	4.253	4.645	1.081
MASS, LB NOX	.044	.120	.178	.177	.039	.559
MASS, PERCENT OF TOTAL CYCLE	7.9	21.5	31.9	31.7	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.792

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	23.6	33.5
HC (IDLE)	5.8	6.5
NOX (TAKEOFF)	11.0	24.2

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 4
RAT SHP= 786. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 48. REL HUM= 100.00 SPEC HUM= .005000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	71	72	73	74	75	76	77
PERCENT MAX. CORRECTED POWER	5.0	7.7	10.1	30.0	70.3	90.7	100.5
CORRECTED SHAFT HP	35.5	54.6	71.0	211.6	496.3	640.5	709.5
MEASURED SHAFT HP	33.5	51.5	67.0	199.7	467.6	604.1	669.2
SHAFT SPEED, N1, RPM	27540.0	27530.0	27540.0	41740.0	41740.0	41750.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	40.0	39.0	39.0	40.0	38.0	39.0	39.0
COMPRESSOR DSCHG. PRES.,PSIA	49.9	50.3	50.6	138.3	144.9	150.5	152.3
COMPRESSOR DSCHG. TEMP,DEG F	388.0	387.0	389.0	630.0	639.0	644.0	646.0
TURB INTERSTAGE TEMP., DEG.F	820.0	895.0	955.0	1065.0	1132.0	1340.0	1420.0
CORR BELLMTH FLOW, LB/SEC	3.04	2.98	2.92	8.01	7.97	8.00	7.99
FA RATIO BASED ON BELLMTH.	.0099	.0189	.0122	.0092	.0125	.0142	.0151
MEASURED FUEL FLOW, LB/HR	186.0	114.5	126.0	256.5	352.0	408.0	425.5
FA RATIO CALC. FROM EMISSION	.0095	.0103	.0118	.0093	.0126	.0144	.0153
EQUIVALENCE RATIO	.139	.151	.161	.136	.185	.211	.225
LOADING W/P**N/V/E(T/548)	.326	.316	.395	.079	.072	.067	.065
COMB EFFIC FROM EMISSIONS	98.937	99.320	99.448	99.794	99.936	99.968	99.966

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.95	2.14	2.29	1.93	2.64	3.83	3.23
LB. CO2 PER LB. OF FUEL	3.18	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	328.7	357.8	393.6	812.2	1108.8	1268.6	1341.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	233.8	196.1	183.7	65.2	30.4	23.1	22.3
LB. PER 1000 LB. OF FUEL	23.565	18.171	15.978	6.755	2.305	1.527	1.383
WEIGHT FLOW, LB./HR.	2.498	2.081	2.012	1.746	.811	.611	.588
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	100.5	54.3	40.5	9.0	2.7	1.2	.6
LB. PER 1000 LB. OF FUEL	5.802	2.876	2.012	.533	.117	.045	.021
WEIGHT FLOW, LB./HR.	.615	.329	.254	.138	.041	.018	.009
RATIO LB HC/LB CO	.2462	.1583	.1268	.0789	.0508	.0297	.0154
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.8	17.7	21.3	48.5	78.2	93.8	101.5
LB. PER 1000 LB. OF FUEL	2.157	2.694	3.042	6.589	9.736	10.190	10.352
WEIGHT FLOW, LB./HR.	.229	.308	.383	1.701	3.428	4.076	4.405
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	8.6	9.5	9.7	13.4	6.1	5.8	5.5
LB. PER 1000 LB. OF FUEL	1.427	.837	.814	2.279	.760	.543	.561
WEIGHT FLOW, LB./HR.	.151	.096	.103	.589	.267	.217	.239
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.6	23.2	27.8	53.9	84.3	98.8	107.8
LB. PER 1000 LB. OF FUEL	3.584	3.531	3.856	9.169	10.496	10.733	10.913
WEIGHT FLOW, LB./HR.	.380	.404	.486	2.378	3.695	4.293	4.643
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00695	.00690	.00697	.00704	.00706	.00708	.00707
SMOKE NUMBER	2.30	1.20	1.20	4.70	7.00	4.70	4.70
CORRECTED WEIGHT FLOW	.02061	.02069	.02092	.02113	.02119	.02123	.02122
SMOKE NUMBER	7.00	3.50	5.00	10.50	14.00	11.60	10.50
CORRECTED WEIGHT FLOW	.03468	.03443	.03486	.03521	.03531	.03536	.03537
SMOKE NUMBER	9.00	5.00	5.00	14.00	23.30	19.00	17.40
CORRECTED WEIGHT FLOW	.04856	.04820	.04881	.04930	.04944	.04953	.04952
SMOKE NUMBER	4.70	7.00	7.00	18.60	25.60	24.40	20.90
SMOKE NUMBER AT WA=8.023	5.00	4.50	5.00	12.10	17.60	15.30	13.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-5-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 4
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.091	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.175	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.906	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.2	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 4 DATE: 11-5-75 TIME: BARO PRESS.: 28.780 IN. HGA.
AMBIENT AIR TEMP.: 39.00 DEG. F RELATIVE HUMIDITY: 100.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	78	79	80	81	82	83	84
ACTUAL POWER SETTING, HORSEPOWER	33.5	49.6	65.7	200.8	466.8	681.4	669.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.05	7.45	9.87	30.18	70.24	90.31	100.41
N1 SPEED, RPM	27580.00	27530.00	27510.00	41750.00	41710.00	41770.00	41750.00
FUEL FLOW (MEAS.) LB./HR.	103.0	113.0	127.0	264.0	356.0	405.0	431.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.1	3.0	2.9	8.8	8.8	8.8	8.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	37.00	39.00	39.00	38.00	37.00	39.00	40.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.14	14.14	14.14	14.14	14.14	14.14	14.14
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	50.44	50.59	50.59	138.75	146.61	150.54	152.75
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	306.00	308.00	308.00	630.00	637.00	646.00	649.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	826.0	887.0	947.0	1060.0	1260.0	1336.0	1431.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	14.02	14.03	14.07	14.08
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	70.500	51.300	40.500	7.500	.900	.600	.600
CARBON MONOXIDE (CO), PPMV	216.165	202.590	187.620	64.394	25.107	20.653	20.249
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.200	24.700	28.000	56.300	87.000	99.250	106.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.917	2.099	2.311	1.949	2.623	3.031	3.225
NITRIC OXIDE (NO), PPMV	13.300	16.000	22.000	41.300	76.200	91.250	100.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.157	2.771	1.991	.440	.039	.023	.021
CARBON MONOXIDE (CO)	22.298	19.148	16.152	6.607	1.819	1.367	1.260
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.592	3.635	3.955	9.488	10.924	10.766	10.657
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.428	.313	.253	.116	.014	.009	.009
CARBON MONOXIDE (CO)	2.297	2.164	2.051	1.744	.663	.554	.543
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.370	.433	.502	2.505	3.889	4.369	4.679
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.11	99.31	99.45	99.81	99.95	99.97	99.97
F/A (EMISSIONS,CALC)	.0093	.0101	.0111	.0093	.0125	.0144	.0153

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED SEG V38 N136 CALC DATE :11-5-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 4
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.865	26.475	5.883	63.540
FUEL FLOW, LB/HR	102.856	102.856	263.106	404.271	429.690	
FUEL MASS, LB	12.000	32.571	19.733	16.845	3.581	84.729
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.191	4.191	.454	.037	.015	2.318
RATE, LB HC/HR	.431	.431	.120	.015	.006	.352
MASS, LB HC	.050	.136	.009	.001	.000	.196
MASS, PERCENT OF TOTAL CYCLE	25.6	69.5	4.6	.3	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.091
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	22.356	22.356	6.631	1.359	1.292	13.629
RATE, LB CO/HR	2.299	2.299	1.745	.549	.555	2.868
MASS, LB CO	.268	.728	.131	.023	.005	1.155
MASS, PERCENT OF TOTAL CYCLE	23.2	63.1	11.3	2.0	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.175
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.584	3.584	9.420	18.744	18.965	6.679
RATE, LB NOX/HR	.369	.369	2.478	4.343	4.711	1.813
MASS, LB NOX	.043	.117	.186	.181	.039	.566
MASS, PERCENT OF TOTAL CYCLE	7.6	20.6	32.8	32.0	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.906

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	22.4	34.7
HC (IDLE)	4.2	6.8
NOX (TAKEOFF)	11.8	23.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 4
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 40. REL HUM= 100.00 SPEC HUM= .005000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	78	79	80	81	82	83	84
PERCENT MAX. CORRECTED POWER	5.0	7.5	9.9	30.2	70.2	90.3	100.4
CORRECTED SHAFT HP	35.6	52.6	69.7	213.1	495.9	637.6	708.9
MEASURED SHAFT HP	33.5	49.6	65.7	200.8	466.8	601.4	669.3
SHAFT SPEED, N1, RPM	27580.0	27530.0	27510.0	41750.0	41710.0	41770.0	41750.0
COMPRESSOR INLET TEMP.,DEG.F	37.0	39.0	39.0	38.0	37.0	39.0	40.0
COMPRESSOR DSCHG. PRES.,PSIA	50.4	50.6	50.6	138.8	146.6	150.5	152.8
COMPRESSOR DSCHG. TEMP,DEG F	306.0	308.0	308.0	630.0	637.0	646.0	649.0
TURB INTERSTAGE TEMP., DEG.F	826.0	887.0	947.0	1060.0	1260.0	1336.0	1431.0
CORR BELLMTH FLOW, LB/SEC	3.07	2.99	2.95	8.01	8.01	8.02	8.00
FA RATIO BASED ON BELLMTH.	.0095	.0107	.0122	.0093	.0126	.0143	.0153
MEASURED FUEL FLOW, LB/HR	103.0	113.8	127.0	264.0	356.0	405.0	431.8
FA RATIO CALC. FROM EMISSION	.0093	.0101	.0111	.0093	.0125	.0144	.0153
EQUIVALENCE RATIO	.136	.149	.163	.137	.183	.211	.224
LOADING W/P**N/V/E(T/540)	.324	.313	.309	.079	.071	.067	.064
COMB EFFIC FROM EMISSIONS	99.111	99.306	99.445	99.806	99.951	99.966	99.968

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.92	2.10	2.31	1.95	2.62	3.03	3.22
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	320.1	352.1	396.6	823.6	1121.7	1276.5	1358.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	216.2	202.6	187.8	64.4	25.1	20.7	20.2
LB. PER 1000 LB. OF FUEL	22.298	19.148	16.152	6.607	1.919	1.367	1.268
WEIGHT FLOW, LB./HR.	2.297	2.164	2.051	1.744	.683	.554	.543
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	70.5	51.3	40.5	7.5	.9	.6	.6
LB. PER 1000 LB. OF FUEL	4.157	2.771	1.991	.440	.039	.023	.021
WEIGHT FLOW, LB./HR.	.428	.313	.253	.116	.014	.009	.009
RATIO LB HC/LB CO	.1864	.1447	.1233	.0666	.0205	.0166	.0169
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.3	16.0	22.0	41.3	76.2	91.3	100.0
LB. PER 1000 LB. OF FUEL	2.254	2.795	3.108	6.960	9.568	9.919	10.219
WEIGHT FLOW, LB./HR.	.232	.316	.395	1.838	3.406	4.017	4.404
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	7.9	6.7	6.0	15.0	10.8	8.0	6.3
LB. PER 1000 LB. OF FUEL	1.339	1.040	.848	2.528	1.356	.870	.639
WEIGHT FLOW, LB./HR.	.136	.118	.108	.667	.483	.352	.275
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.2	24.7	28.0	56.3	87.0	99.2	106.3
LB. PER 1000 LB. OF FUEL	3.592	3.835	3.955	9.488	10.924	10.788	10.857
WEIGHT FLOW, LB./HR.	.370	.433	.502	2.505	3.889	4.369	4.679
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00698	.00695	.00699	.00703	.00705	.00705	.00705
SMOKE NUMBER	1.20	1.20	3.50	3.50	7.00	3.50	4.70
CORRECTED WEIGHT FLOW	.02094	.02086	.02098	.02108	.02115	.02115	.02115
SMOKE NUMBER	4.70	5.80	3.50	9.30	12.80	11.60	10.50
CORRECTED WEIGHT FLOW	.03494	.03477	.03503	.03519	.03526	.03525	.03525
SMOKE NUMBER	5.80	4.70	4.70	15.10	18.60	17.40	15.10
CORRECTED WEIGHT FLOW	.04868	.04868	.04904	.04927	.04936	.04935	.04935
SMOKE NUMBER	8.10	5.80	7.00	17.40	25.60	22.10	20.90
SMOKE NUMBER AT WA=0.023	5.00	4.40	4.70	11.50	16.20	13.80	12.90

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-26-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 5
FUEL: ASTM D 1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.072	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	15.893	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	10.038	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.2	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 865082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:
USER: MODEL NO.:
ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 5 DATE: 10-26-75 TIME: BARO PRESS.: 28.628 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 20.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	85	86	87	88	89	90	91
ACTUAL POWER SETTING, HORSEPOWER	36.0	48.8	67.9	204.0	475.1	613.4	680.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.29	7.18	9.98	29.99	69.86	90.20	100.04
N1 SPEED, RPM	27550.00	27540.00	27500.00	41730.00	41730.00	41730.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	108.0	119.0	125.0	251.0	344.0	396.0	421.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.8	7.7	7.7	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	59.00	59.00	59.00	59.00	59.00	59.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.12	14.12	14.12	14.12	14.12	14.12	14.12
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.66	47.25	47.25	130.65	137.38	140.77	142.44
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	337.00	337.00	336.00	661.00	677.00	682.00	684.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	915.0	960.0	1038.0	1111.0	1338.0	1460.0	1516.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.11	14.12	14.13	14.04	14.06	14.09	14.10
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	45.000	33.000	28.200	6.600	3.000	2.700	2.700
CARBON MONOXIDE (CO), PPMV	192.874	180.966	164.680	60.617	27.546	16.223	16.223
TOTAL OXIDES OF NITROGEN (NOX), PPMV	26.100	30.700	34.600	62.600	100.000	122.500	132.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.056	2.238	2.514	1.959	2.714	3.154	3.389
NITRIC OXIDE (NO), PPMV	19.500	23.500	28.000	48.100	90.000	112.000	122.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.482	1.676	1.277	.385	.127	.098	.091
CARBON MONOXIDE (CO)	18.615	16.080	13.051	6.192	2.035	1.032	.960
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.138	4.481	4.504	18.583	12.136	12.801	12.911
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.268	.199	.160	.097	.044	.039	.038
CARBON MONOXIDE (CO)	2.010	1.914	1.631	1.554	.700	.489	.484
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.447	.533	.563	2.636	4.175	5.869	5.435
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.74	99.47	99.58	99.82	99.94	99.97	99.97
F/A (EMISSIONS,CALC)	.0099	.0108	.0121	.0094	.0129	.0150	.0161

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-26-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 5
FUEL: ASTM D 1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	105.636	105.636	251.088	393.698	421.651	
FUEL MASS, LB	12.324	33.451	18.832	16.404	3.514	84.525
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	2.672	2.672	.385	.111	.086	1.558
RATE, LB HC/HR	.282	.282	.097	.044	.036	.236
MASS, LB HC	.033	.089	.087	.002	.000	.132
MASS, PERCENT OF TOTAL CYCLE	25.0	67.9	5.5	1.4	.2	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.072
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.089	19.089	6.193	.973	.985	11.947
RATE, LB CO/HR	2.016	2.016	1.555	.383	.415	1.809
MASS, LB CO	.235	.639	.117	.016	.003	1.010
MASS, PERCENT OF TOTAL CYCLE	23.3	63.2	11.5	1.6	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						15.893
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	4.038	4.038	10.585	12.789	12.913	7.546
RATE, LB NOX/HR	.427	.427	2.638	5.035	5.445	1.142
MASS, LB NOX	.058	.135	.198	.218	.045	.638
MASS, PERCENT OF TOTAL CYCLE	7.8	21.2	31.0	32.9	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						10.038

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.1	34.2
HC (IDLE)	2.7	6.6
NOX (TAKEOFF)	12.9	22.1

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 5

RAT SHP= 706. RA EGT,F= 0. RAT SPD= 41730. DEW PT,F= 19. REL HUM= 20.00 SPEC HUM= .002888

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5088

DATA POINT NUMBER	85	86	87	88	89	90	91
PERCENT MAX. CORRECTED POWER	5.3	7.2	10.0	30.0	69.9	90.2	100.0
CORRECTED SHAFT HP	37.4	50.7	70.5	211.8	493.2	636.8	706.3
MEASURED SHAFT HP	36.0	48.8	67.9	204.0	475.1	613.4	680.3
SHAFT SPEED, N1, RPM	27550.0	27540.0	27500.0	41730.0	41730.0	41730.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	59.0	59.0	59.0	59.0	59.0	59.0
COMPRESSOR DSCHG. PRES.,PSIA	46.7	47.2	47.2	130.6	137.4	140.6	142.4
COMPRESSOR DSCHG. TEMP,DEG F	337.0	337.0	336.0	661.0	677.0	682.0	684.0
TURB INTERSTAGE TEMP., DEG.F	915.0	960.0	1038.0	1111.0	1338.0	1460.0	1516.0
CORR BELLMTH FLOW, LB/SEC	2.89	2.86	2.78	7.82	7.70	7.67	7.67
FA RATIO BASED ON BELLMTH.	.0108	.0120	.0130	.0093	.0129	.0149	.0158
MEASURED FUEL FLOW, LB/HR	108.0	119.0	125.0	251.0	344.0	396.0	421.0
FA RATIO CALC. FROM EMISSION	.0099	.0108	.0121	.0094	.0129	.0150	.0161
EQUIVALENCE RATIO	.145	.158	.177	.138	.189	.220	.236
LOADING W/P**N/V/E(T/540)	.324	.313	.306	.079	.070	.066	.064
COMB EFFIC FROM EMISSIONS	99.344	99.475	99.581	99.821	99.941	99.967	99.969
SUMMARY OF REDUCED EMISSION DATA							
CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.06	2.24	2.51	1.96	2.71	3.15	3.39
LB. CO2 PER LB. OF FUEL	3.12	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	336.7	371.8	391.3	789.0	1083.8	1248.3	1327.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	192.9	181.0	164.7	60.6	27.5	16.2	16.2
LB. PER 1000 LB. OF FUEL	18.615	16.080	13.051	6.192	2.035	1.032	.960
WEIGHT FLOW, LB./HR.	2.010	1.914	1.631	1.554	.700	.409	.404
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	45.0	33.0	28.2	6.6	3.0	2.7	2.7
LB. PER 1000 LB. OF FUEL	2.482	1.676	1.277	.385	.127	.098	.091
WEIGHT FLOW, LB./HR.	.268	.199	.160	.097	.044	.039	.038
RATIO LB HC/LB CO	.1334	.1042	.0979	.0622	.0623	.0951	.0951
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	19.5	23.5	28.0	48.1	90.0	112.0	122.0
LB. PER 1000 LB. OF FUEL	3.091	3.430	3.645	8.070	10.922	11.784	11.865
WEIGHT FLOW, LB./HR.	.334	.408	.456	2.026	3.757	4.635	4.995
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.6	7.2	6.6	14.5	10.0	10.5	10.7
LB. PER 1000 LB. OF FUEL	1.046	1.051	.859	2.433	1.214	1.097	1.045
WEIGHT FLOW, LB./HR.	.113	.125	.107	.611	.417	.435	.448
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	26.1	30.7	34.6	62.6	100.0	122.5	132.7
LB. PER 1000 LB. OF FUEL	4.138	4.481	4.504	10.503	12.136	12.881	12.911
WEIGHT FLOW, LB./HR.	.447	.533	.563	2.636	4.175	5.069	5.435
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00701	.00700	.00714	.00713	.00715	.00714	.00715
SMOKE NUMBER	2.30	2.30	2.30	2.30	5.80	5.80	5.80
CORRECTED WEIGHT FLOW	.02104	.02100	.02146	.02140	.02143	.02142	.02150
SMOKE NUMBER	3.50	2.30	4.70	10.50	11.60	10.50	10.50
CORRECTED WEIGHT FLOW	.03507	.03505	.03569	.03566	.03565	.03570	.03583
SMOKE NUMBER	5.80	7.00	4.70	14.00	17.40	14.00	18.60
CORRECTED WEIGHT FLOW	.04908	.04916	.04997	.04991	.04991	.05008	.05016
SMOKE NUMBER	9.30	9.30	7.00	19.80	25.60	22.10	20.90
SMOKE NUMBER AT WA=0.023	5.30	5.30	4.70	11.70	15.20	13.10	14.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V36 N136 CALC DATE :10-27-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 5
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.289	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.026	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.944	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.2	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 5 DATE: 10-27-75 TIME: BARO PRESS.: 28.730 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 20.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	92	93	94	95	96	97	98
ACTUAL POWER SETTING, HORSEPOWER	33.9	51.4	68.3	204.0	475.6	612.3	680.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.00	7.57	10.07	30.09	70.19	90.32	100.38
N1 SPEED, RPM	27560.00	27560.00	27530.00	41740.00	41750.00	41740.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	106.0	119.0	128.0	255.0	347.0	396.0	425.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.6	2.6	2.6	7.6	7.7	7.7	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	59.00	59.00	59.00	59.00	59.00	59.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.11	14.11	14.11	14.11	14.11	14.11	14.11
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.56	47.00	47.15	131.63	138.02	142.34	143.07
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	336.00	336.00	338.00	661.00	672.00	680.00	682.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	905.0	976.0	1045.0	1110.0	1335.0	1450.0	1512.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.06	14.07	14.08	14.00	14.01	14.05	14.06
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	52.500	29.100	21.000	8.700	2.700	1.800	2.100
CARBON MONOXIDE (CO), PPMV	194.717	177.782	165.129	62.714	25.919	21.057	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	25.000	30.400	35.800	61.200	99.750	118.750	130.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.037	2.267	2.534	1.959	2.677	3.095	3.333
NITRIC OXIDE (NO), PPMV	18.100	24.100	29.000	48.000	98.250	115.000	123.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.921	1.447	.944	.508	.116	.067	.072
CARBON MONOXIDE (CO)	18.955	15.467	12.984	6.404	1.942	1.365	.952
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.998	4.344	4.624	10.266	12.276	12.642	12.853
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.310	.172	.121	.129	.040	.026	.031
CARBON MONOXIDE (CO)	2.809	1.841	1.662	1.633	.674	.540	.405
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.424	.517	.592	2.618	4.260	5.006	5.462
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.30	99.51	99.61	99.80	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0098	.0110	.0122	.0094	.0127	.0147	.0158

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-27-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 5
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	106.025	106.025	254.090	393.664	427.341	
FUEL MASS, LB	12.370	33.575	19.057	16.403	3.561	84.965
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	2.918	2.918	.517	.088	.025	1.712
RATE, LB HC/HR	.309	.309	.131	.034	.011	.260
MASS, LB HC	.036	.098	.010	.001	.000	.145
MASS, PERCENT OF TOTAL CYCLE	24.8	67.4	6.8	1.8	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.289
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	18.949	18.949	6.405	1.329	1.076	11.985
RATE, LB CO/HR	2.009	2.009	1.628	.523	.460	1.824
MASS, LB CO	.234	.636	.122	.022	.004	1.018
MASS, PERCENT OF TOTAL CYCLE	23.0	62.5	12.0	2.1	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.026
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.998	3.998	10.244	12.628	12.859	7.437
RATE, LB NOX/HR	.424	.424	2.603	4.971	5.495	1.132
MASS, LB NOX	.049	.134	.195	.207	.046	.632
MASS, PERCENT OF TOTAL CYCLE	7.8	21.2	30.9	32.8	7.2	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.944

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

POLLUTANT	EPA LTO-CYCLE LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

POLLUTANT (MODE)	REQUIRED EMISSION INDEX, LBP/1000 LB FUEL A	B
CO (IDLE)	18.9	33.8 *
HC (IDLE)	2.9	6.5
NOX (TAKEOFF)	12.9	22.4

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 5
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. OEM PT,F= 19. REL HUM= 20.00 SPEC HUM= .002000
FUE. H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	92	93	94	95	96	97	98
PERCENT MAX. CORRECTED POWER	5.0	7.6	10.1	30.1	70.2	90.3	100.4
CORRECTED SHAFT HP	35.3	53.5	71.1	212.5	495.5	637.7	708.7
MEASURED SHAFT HP	33.9	51.4	68.3	204.0	475.6	612.3	680.5
SHAFT SPEED, N1, RPM	27588.0	27560.0	27530.0	41740.0	41750.0	41740.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	59.0	59.0	59.0	59.0	59.0	59.0
COMPRESSOR DSCHG. PRES.,PSIA	46.6	47.0	47.2	131.6	136.0	142.3	143.1
COMPRESSOR DSCHG. TEMP,DEG F	336.0	338.0	338.0	661.0	672.0	680.0	682.0
TURB INTERSTAGE TEMP., DEG.F	985.0	978.0	1045.0	1110.0	1335.0	1450.0	1512.0
CORR BELLMTH FLOW, LB/SEC	2.85	2.80	2.84	7.76	7.71	7.72	7.67
FA RATIO BASED ON BELLMTH.	.0108	.0123	.0138	.0095	.0130	.0148	.0160
MEASURED FUEL FLOW, LB/HR	106.0	119.0	128.0	255.0	347.0	396.0	425.0
FA RATIO CALC. FROM EMISSION	.0098	.0110	.0122	.0094	.0127	.0147	.0158
EQUIVALENCE RATIO	.144	.161	.178	.138	.187	.216	.232
LOADING W/P**N/V/E(T/540)	.320	.309	.311	.078	.070	.065	.064
COMB EFFIC FROM EMISSIONS	99.298	99.589	99.612	99.805	99.944	99.962	99.971

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.04	2.29	2.53	1.96	2.68	3.18	3.33
LB. CO2 PER LB. OF FUEL	3.12	3.13	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	330.3	372.0	400.6	801.4	1093.3	1248.1	1339.8
CARBON MONOXIDE							
PPM BY VOLUME, WET	194.7	177.8	165.1	62.7	25.9	21.1	15.8
LB. PER 1000 LB. OF FUEL	18.955	15.467	12.984	6.404	1.942	1.365	.952
WEIGHT FLOW, LB./HR.	2.009	1.841	1.662	1.633	.674	.540	.405
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	52.5	29.1	21.0	8.7	2.7	1.8	2.1
LB. PER 1000 LB. OF FUEL	2.921	1.447	.944	.538	.116	.067	.072
WEIGHT FLOW, LB./HR.	.310	.172	.121	.129	.040	.026	.031
RATIO LB HC/LB CO	.1541	.0936	.0727	.0793	.0595	.0489	.0759
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	18.1	24.1	29.0	48.0	90.2	115.8	123.8
LB. PER 1000 LB. OF FUEL	2.894	3.444	3.746	8.052	11.187	12.243	12.161
WEIGHT FLOW, LB./HR.	.307	.410	.479	2.053	3.854	4.848	5.168
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.9	6.3	6.8	13.2	9.5	3.8	7.8
LB. PER 1000 LB. OF FUEL	1.103	.900	.878	2.214	1.169	.399	.692
WEIGHT FLOW, LB./HR.	.117	.107	.112	.565	.406	.158	.294
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	25.0	30.4	35.8	61.2	99.7	118.8	130.8
LB. PER 1000 LB. OF FUEL	3.998	4.344	4.624	10.266	12.276	12.642	12.853
WEIGHT FLOW, LB./HR.	.424	.517	.592	2.618	4.260	5.006	5.462
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00722	.00720	.00720	.00715	.00713	.00711	.00709
SMOKE NUMBER	3.50	5.80	4.70	4.70	5.80	4.70	5.80
CORRECTED WEIGHT FLOW	.02161	.02156	.02152	.02144	.02140	.02132	.02128
SMOKE NUMBER	3.50	7.00	5.80	9.30	11.60	11.60	11.60
CORRECTED WEIGHT FLOW	.03601	.03593	.03586	.03573	.03566	.03553	.03546
SMOKE NUMBER	7.00	7.00	3.50	14.00	18.60	17.40	16.30
CORRECTED WEIGHT FLOW	.05033	.05030	.05020	.04992	.04992	.04974	.04965
SMOKE NUMBER	9.30	8.10	7.00	18.60	24.40	22.10	20.90
SMOKE NUMBER AT WA=8.023	5.60	7.00	5.40	11.70	15.20	14.10	13.80

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-27-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(GLASS): TURBOPROP CALC ID: 3
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 5
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.028	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	14.768	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.898	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.7	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 75 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869862-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 5 DATE: 10-27-75 TIME: BARO PRESS.: 28.730 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 20.00 PERCENT SPECIFIC HUMIDITY: .002000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	99	100	101	102	103	104	105
ACTUAL POWER SETTING, HORSEPOWER	33.7	51.1	67.6	203.9	475.0	613.3	679.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.97	7.53	9.98	30.06	70.01	90.46	100.23
N1 SPEED, RPM	27560.00	27580.00	27540.00	41720.00	41770.00	41720.00	41710.00
FUEL FLOW (MEAS.) LB./HR.	105.0	117.0	128.0	247.0	343.0	394.0	421.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.6	2.7	7.8	7.7	7.7	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	59.00	59.00	59.00	60.00	59.00	59.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.11	14.11	14.11	14.11	14.11	14.11	14.11
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.86	47.35	47.40	130.26	137.28	140.72	142.93
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	337.00	338.00	338.00	663.00	678.00	680.00	682.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	904.8	975.0	1039.0	1114.0	1342.0	1465.0	1515.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.07	14.07	14.07	14.08	14.01	14.05	14.06
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	48.000	35.400	21.300	5.100	1.200	1.800	.600
CARBON MONOXIDE (CO), PPMV	178.691	172.795	161.538	61.036	20.653	18.233	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	26.000	30.800	35.000	62.800	98.500	118.000	129.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.014	2.272	2.493	1.945	2.703	3.207	3.389
NITRIC OXIDE (NO), PPMV	19.200	24.200	28.600	48.200	88.750	109.250	119.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.784	1.772	.973	.398	.051	.064	.020
CARBON MONOXIDE (CO)	17.612	15.129	12.912	6.279	1.532	1.141	.937
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.209	4.429	4.596	10.612	12.005	12.125	12.571
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.284	.207	.125	.074	.017	.025	.009
CARBON MONOXIDE (CO)	1.849	1.770	1.653	1.551	.526	.449	.394
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.442	.518	.588	2.621	4.118	4.777	5.292
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.35	99.49	99.61	99.83	99.96	99.97	99.98
F/A (EMISSIONS,CALC)	.0097	.0109	.0128	.0093	.0129	.0152	.0161

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-27-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 5
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	105.159	105.159	246.457	391.795	421.302	
FUEL MASS, LB	12.269	33.300	18.484	16.325	3.511	83.889
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	2.692	2.692	.291	.036	.050	1.536
RATE, LB HC/HR	.283	.263	.072	.014	.021	.231
MASS, LB HC	.033	.090	.005	.001	.000	.129
MASS, PERCENT OF TOTAL CYCLE	25.6	69.6	4.2	.5	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.028
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	17.550	17.580	6.278	1.982	1.006	11.185
RATE, LB CO/HR	1.849	1.849	1.547	.424	.424	1.681
MASS, LB CO	.216	.585	.116	.018	.004	.938
MASS, PERCENT OF TOTAL CYCLE	23.0	62.4	12.4	1.9	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						14.768
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	4.214	4.214	18.585	12.870	12.595	7.497
RATE, LB NOX/HR	.443	.443	2.689	4.729	5.306	1.126
MASS, LB NOX	.052	.140	.196	.197	.044	.629
MASS, PERCENT OF TOTAL CYCLE	8.2	22.3	31.1	31.3	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.898

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	17.6	34.4
HC (IDLE)	2.7	6.7
NOX (TAKEOFF)	12.6	22.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04801 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 5

RAT SHP= 706. RA EGT,F= 1658. RAT SPD= 41730. DEW PT,F= 19. RE. NUM= 28.00 SPEC NUM= .002000

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LN T,F= 388.0 FLO,L/H= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	99	100	101	102	103	104	105
PERCENT MAX. CORRECTED POWER	5.0	7.5	10.0	30.1	70.0	90.5	100.2
CORRECTED SHAFT HP	35.1	53.2	70.4	212.4	494.2	638.7	707.6
MEASURED SHAFT HP	33.7	51.1	67.6	203.9	475.0	613.3	679.5
SHAFT SPEED, N1, RPM	27560.0	27580.0	27540.0	41720.0	41770.0	41720.0	41710.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	59.0	59.0	59.0	60.0	59.0	59.0
COMPRESSOR DSCHG. PRES.,PSIA	46.9	47.3	47.4	130.3	137.3	140.7	142.9
COMPRESSOR DSCHG. TEMP.DEG F	337.0	338.0	338.0	663.0	678.0	680.0	682.0
TUR3 INTERSTAGE TEMP., DEG.F	904.0	975.0	1039.0	1114.0	1342.0	1465.0	1515.0
CORR BELMTH FLOW, LB/SEC	2.94	2.83	2.73	7.76	7.72	7.68	7.64
FA RATIO BASED ON BELLMTH.	.0103	.0120	.0135	.0092	.0129	.0148	.0159
MEASURED FUEL FLOW, LB/HR	105.0	117.0	128.0	247.0	343.0	394.0	421.0
FA RATIO CALC. FROM EMISSION	.0097	.0109	.0120	.0093	.0129	.0152	.0161
EQUIVALENCE RATIO	.142	.160	.175	.137	.189	.223	.236
LOADING W/P**N/V/E(T/540)	.326	.386	.297	.879	.069	.066	.064
COMB EFFIC FROM EMISSIONS	99.349	99.489	99.611	99.826	99.959	99.968	99.976
SUMMARY OF REDUCED EMISSION DATA							
CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.01	2.27	2.49	1.94	2.78	3.21	3.39
LB. CO2 PER LB. OF FUEL	3.12	3.13	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	327.5	365.7	400.8	776.4	1081.0	1241.9	1327.2
CARBON MONOXIDE							
PPM BY VOLUME, WET	178.7	172.8	161.5	61.8	20.7	18.2	15.8
LB. PER 1000 LB. OF FUEL	17.612	15.129	12.912	6.279	1.532	1.141	.937
WEIGHT FLOW, LB./HR.	1.849	1.778	1.653	1.551	.526	.449	.394
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	48.0	35.4	21.3	5.1	1.2	1.8	.6
LB. PER 1000 LB. OF FUEL	2.704	1.772	.973	.388	.051	.064	.028
WEIGHT FLOW, LB./HR.	.284	.207	.125	.074	.017	.025	.009
RATIO LB HC/LB CO	.1535	.1171	.0754	.0478	.0332	.0564	.0217
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	19.2	24.2	28.6	48.2	88.8	109.2	119.5
LB. PER 1000 LB. OF FUEL	3.188	3.488	3.755	8.145	18.817	11.226	11.623
WEIGHT FLOW, LB./HR.	.326	.407	.481	2.012	3.710	4.423	4.893
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.8	6.6	6.4	14.6	9.8	8.8	9.8
LB. PER 1000 LB. OF FUEL	1.101	.949	.840	2.467	1.188	.899	.948
WEIGHT FLOW, LB./HR.	.116	.111	.108	.609	.408	.354	.399
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	26.0	30.8	35.0	62.8	98.5	118.0	129.2
LB. PER 1000 LB. OF FUEL	4.289	4.429	4.596	10.612	12.005	12.125	12.571
WEIGHT FLOW, LB./HR.	.442	.518	.588	2.621	4.118	4.777	5.292
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00698	.00738	.00788	.00699	.00697	.00696	.00695
SMOKE NUMBER	1.20	3.50	1.20	4.70	7.00	4.70	5.80
CORRECTED WEIGHT FLOW	.02093	.02100	.02100	.02098	.02090	.02089	.02086
SMOKE NUMBER	5.80	5.80	4.70	10.50	12.80	10.50	10.50
CORRECTED WEIGHT FLOW	.03493	.03588	.03499	.03497	.03484	.03482	.03476
SMOKE NUMBER	7.80	4.70	5.80	11.60	18.60	18.60	18.60
CORRECTED WEIGHT FLOW	.04890	.04900	.04899	.04895	.04877	.04875	.04857
SMOKE NUMBER	9.30	7.00	8.10	17.40	23.30	22.10	19.80
SMOKE NUMBER AT WA=8.823	5.90	5.30	5.00	11.20	15.70	14.20	13.90

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC DATE :10-28-75
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS CALC ID: I
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE TEST NO: 6

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.289	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.475	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	10.073	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.7	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:
USER: MODEL NO.:
ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 6 DATE: 10-28-75 TIME: BARO PRESS.: 28.820 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	106	107	108	109	110	111	112
ACTUAL POWER SETTING, HORSEPOWER	34.0	51.0	68.2	204.7	475.8	615.2	684.1
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.99	7.48	10.00	30.13	70.10	90.29	100.69
N1 SPEED, RPM	27540.00	27550.00	27570.00	41770.00	41750.00	41730.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	105.0	116.0	125.0	253.0	348.0	399.0	426.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.9	7.8	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	60.00	62.00	62.00	58.00	57.00	61.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.16	14.16	14.16	14.16	14.16	14.16	14.16
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.30	47.54	47.79	132.86	140.57	143.66	146.66
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	330.00	334.00	335.00	695.00	659.00	668.00	669.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	888.0	950.0	1030.0	1105.0	1319.0	1443.0	1580.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	14.04	14.05	14.09	14.10
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	53.400	40.500	33.600	5.400	2.400	1.800	1.500
CARBON MONOXIDE (CO), PPMV	201.660	188.279	175.059	56.850	27.953	20.249	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	27.000	29.400	35.200	63.700	90.000	112.500	117.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.991	2.213	2.488	1.986	2.650	3.089	3.327
NITRIC OXIDE (NO), PPMV	20.300	23.000	28.200	48.800	82.500	102.750	110.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.039	2.078	1.537	.311	.104	.067	.052
CARBON MONOXIDE (CO)	20.076	16.900	14.008	5.728	2.115	1.315	.954
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	4.415	4.335	4.627	10.542	11.186	12.000	11.638
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.319	.241	.192	.079	.036	.027	.022
CARBON MONOXIDE (CO)	2.108	1.960	1.751	1.449	.736	.525	.406
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.464	.503	.578	2.667	3.893	4.788	4.958
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.26	99.42	99.54	99.84	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0096	.0107	.0119	.0095	.0126	.0147	.0158

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.8 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 6
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	105.037	105.037	251.865	397.871	429.763	
FUEL MASS, LB	12.254	33.262	18.890	16.545	3.581	84.532
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.035	3.035	.316	.073	.028	1.720
RATE, LB HC/HR	.319	.319	.088	.029	.012	.268
MASS, LB HC	.037	.101	.006	.001	.000	.145
MASS, PERCENT OF TOTAL CYCLE	25.6	69.4	4.1	.8	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.289
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	20.866	20.866	5.720	1.273	1.211	12.383
RATE, LB CO/HR	2.108	2.108	1.441	.506	.521	1.875
MASS, LB CO	.246	.687	.108	.021	.004	1.047
MASS, PERCENT OF TOTAL CYCLE	23.5	63.8	10.3	2.0	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.475
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	4.415	4.415	10.522	11.993	11.717	7.572
RATE, LB NOX/HR	.464	.464	2.650	4.762	5.036	1.146
MASS, LB NOX	.054	.147	.199	.198	.042	.648
MASS, PERCENT OF TOTAL CYCLE	8.5	22.9	31.1	31.0	6.6	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						10.873

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	20.1	34.5
HC (IDLE)	3.8	6.7
NOX (TAKEOFF)	11.7	20.5

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 6
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 40. REL HUM= 49.00 SPEC HUM= .005000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S .N T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	106	107	108	109	110	111	112
PERCENT MAX. CORRECTED POWER	5.0	7.5	10.0	30.1	70.1	90.3	100.7
CORRECTED SHAFT HP	35.2	52.8	70.6	212.7	494.9	637.5	710.9
MEASURED SHAFT HP	34.0	51.0	68.2	204.7	475.8	615.2	684.1
SHAFT SPEED, N1, RPM	27540.0	27550.0	27570.0	41770.0	41750.0	41730.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	60.0	62.0	62.0	58.0	57.0	61.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	47.3	47.5	47.8	132.9	140.6	143.7	146.7
COMPRESSOR DSCHG. TEMP,DEG F	330.0	334.0	335.0	695.0	659.0	668.0	669.0
TURB INTERSTAGE TEMP., DEG.F	886.0	950.0	1030.0	1105.0	1319.0	1443.0	1500.0
CORR BELLMTH FLOW, LB/SEC	2.92	2.86	2.78	7.84	7.79	7.78	7.81
FA RATIO BASED ON BELLMTH.	.0104	.0117	.0130	.0092	.0129	.0148	.0157
MEASURED FUEL FLOW, LB/HR	105.0	116.0	125.0	253.0	348.0	399.0	426.0
FA RATIO CALC. FROM EMISSION	.0096	.0107	.0119	.0095	.0126	.0147	.0158
EQUIVALENCE RATIO	.141	.156	.175	.139	.185	.215	.231
LOADING W/F**N/V/E(T/548)	.324	.311	.299	.073	.070	.066	.064
COMB EFFIC FROM EMISSIONS	99.261	99.428	99.536	99.838	99.941	99.963	99.973

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.99	2.21	2.49	1.99	2.65	3.09	3.31
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	327.0	362.1	391.0	795.5	1096.4	1257.6	1342.9
CARBON MONOXIDE							
PPM BY VOLUME, WET	281.7	188.3	175.1	56.8	28.0	28.2	15.8
LB. PER 1000 LB. OF FUEL	20.876	16.988	14.888	5.728	2.115	1.315	.954
WEIGHT FLOW, LB./HR.	2.188	1.968	1.751	1.449	.736	.525	.406
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	53.4	48.5	33.6	5.4	2.4	1.8	1.5
LB. PER 1000 LB. OF FUEL	3.839	2.078	1.537	.311	.184	.067	.052
WEIGHT FLOW, LB./HR.	.319	.241	.192	.079	.036	.027	.022
RATIO LB HC/LB CO	.1514	.1238	.1097	.0543	.0491	.0508	.0542
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	20.3	23.0	28.2	48.8	82.5	102.7	110.7
LB. PER 1000 LB. OF FUEL	3.328	3.391	3.707	6.076	10.254	10.960	10.970
WEIGHT FLOW, LB./HR.	.349	.393	.463	2.043	3.568	4.373	4.673
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.7	6.4	7.8	14.9	7.5	9.6	6.8
LB. PER 1000 LB. OF FUEL	1.896	.944	.928	2.466	.932	1.048	.669
WEIGHT FLOW, LB./HR.	.115	.109	.115	.624	.324	.415	.285
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	27.0	29.4	35.2	63.7	90.0	112.5	117.5
LB. PER 1000 LB. OF FUEL	4.415	4.335	4.627	10.542	11.186	12.008	11.638
WEIGHT FLOW, LB./HR.	.464	.503	.578	2.667	3.893	4.788	4.958
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00697	.00695	.00694	.00697	.00710	.00716	.00716
SMOKE NUMBER	1.20	2.30	1.20	5.80	5.80	8.10	5.80
CORRECTED WEIGHT FLOW	.02030	.02086	.02063	.02092	.02130	.02149	.02149
SMOKE NUMBER	3.50	3.50	4.70	9.30	12.60	11.60	8.10
CORRECTED WEIGHT FLOW	.03477	.03471	.03471	.03492	.03557	.03581	.03581
SMOKE NUMBER	7.00	5.80	2.30	16.30	20.90	17.40	16.30
CORRECTED WEIGHT FLOW	.04868	.04859	.04859	.04889	.04988	.05014	.05014
SMOKE NUMBER	9.30	8.10	7.00	16.30	26.70	23.30	20.90
SMOKE NUMBER AT WA=0.023	5.40	5.00	3.90	12.10	16.70	15.10	12.80

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 6
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.356	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.440	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.562	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.4	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 6 DATE: 10-28-75 TIME: BARO PRESS.: 28.828 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	113	114	115	116	117	118	119
ACTUAL POWER SETTING, HORSEPOWER	33.9	53.9	67.9	199.2	473.2	614.7	688.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.99	7.48	9.97	29.29	69.51	90.38	99.94
N1 SPEED, RPM	27510.00	27510.00	27530.00	41730.00	41760.00	41710.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	105.0	115.0	126.0	253.0	348.0	400.0	426.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.8	7.9	7.8	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	60.00	60.00	61.00	59.00	60.00	60.00	60.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.16	14.16	14.16	14.16	14.16	14.16	14.16
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.45	45.92	46.38	132.37	140.23	141.26	143.22
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	326.00	327.00	326.00	648.00	660.00	666.00	670.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	866.0	949.0	1004.0	1095.0	1318.0	1439.0	1497.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	14.04	14.05	14.09	14.10
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	54.900	43.500	30.300	6.300	1.800	1.800	1.500
CARBON MONOXIDE (CO), PPMV	200.732	192.413	169.633	58.941	25.107	20.249	19.839
TOTAL OXIDES OF NITROGEN (NOX), PPMV	23.800	27.700	31.800	58.509	92.500	110.500	121.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.009	2.248	2.411	1.945	2.671	3.101	3.340
NITRIC OXIDE (NO), PPMV	17.100	21.100	25.400	45.500	84.750	102.500	112.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.095	2.198	1.430	.370	.877	.867	.852
CARBON MONOXIDE (CO)	19.801	17.007	14.005	6.064	1.885	1.318	1.144
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.856	4.022	4.313	9.886	11.407	11.742	11.940
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.325	.253	.180	.094	.027	.027	.022
CARBON MONOXIDE (CO)	2.079	1.956	1.765	1.534	.656	.524	.487
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.405	.463	.543	2.501	3.978	4.697	5.086
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.26	99.41	99.55	99.82	99.95	99.96	99.97
F/A (EMISSIONS,CALC)	.0097	.0108	.0116	.0093	.0127	.0147	.0158

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-26-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 6
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	105.049	105.049	258.183	398.581	425.909	
FUEL MASS, LB	12.256	33.266	19.364	16.688	3.549	85.042
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.091	3.091	.411	.055	.047	1.760
RATE, LB HC/HR	.325	.325	.106	.022	.020	.268
MASS, LB HC	.038	.103	.008	.001	.000	.150
MASS, PERCENT OF TOTAL CYCLE	25.3	68.7	5.3	.6	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.356
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.789	19.789	6.146	1.254	1.120	12.284
RATE, LB CO/HR	2.079	2.079	1.587	.500	.477	1.871
MASS, LB CO	.243	.658	.119	.021	.004	1.045
MASS, PERCENT OF TOTAL CYCLE	23.2	63.0	11.4	2.0	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.448
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.857	3.857	10.871	11.717	11.934	7.144
RATE, LB NOX/HR	.405	.405	2.600	4.678	5.083	1.088
MASS, LB NOX	.047	.128	.195	.195	.042	.608
MASS, PERCENT OF TOTAL CYCLE	7.8	21.1	32.1	32.0	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.562

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.8	34.2
HC (IDLE)	3.1	6.6
NOX (TAKEOFF)	11.9	22.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 6

RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 40. REL HUM= 49.00 SPEC HUM= .005000

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S .N T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	113	114	115	116	117	118	119
PERCENT MAX. CORRECTED POWER	5.0	7.5	10.0	29.3	69.5	98.3	99.9
CORRECTED SHAFT HP	35.2	52.8	70.4	206.8	490.7	637.5	705.6
MEASURED SHAFT HP	33.9	50.9	67.9	199.2	473.2	614.7	680.3
SHAFT SPEED, N1, RPM	27510.0	27510.0	27530.0	41730.0	41760.0	41710.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	60.0	60.0	61.0	59.0	60.0	60.0	60.0
COMPRESSOR DSCHG. PRES.,PSIA	47.4	45.9	48.4	132.4	140.2	141.3	143.2
COMPRESSOR DSCHG. TEMP,DEG F	326.0	327.0	326.0	648.0	660.0	666.0	670.0
TUR3 INTERSTAGE TEMP., DEG.F	886.0	949.0	1004.0	1095.0	1318.0	1439.0	1497.0
CORR BELMTH FLOW, LB/SEC	3.00	2.92	2.85	7.85	7.79	7.80	7.78
FA RATIO BASED ON BELLMTH.	.0101	.0114	.0128	.0093	.0129	.0148	.0158
MEASURED FUEL FLOW, LB/HR	105.0	115.0	126.0	253.0	348.0	408.0	426.0
FA RATIO CALC. FROM EMISSION	.0097	.0108	.0116	.0093	.0127	.0147	.0158
EQUIVALENCE RATIO	.142	.159	.170	.137	.186	.216	.232
LOADING W/P**N/V/E(T/540)	.334	.343	.306	.080	.070	.068	.066
COMB EFFIC FROM EMISSIONS	99.263	99.407	99.545	99.825	99.949	99.963	99.969

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.81	2.25	2.41	1.94	2.67	3.10	3.34
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	327.0	358.9	394.1	795.3	1096.5	1260.7	1342.8
CARBON MONOXIDE							
PPM BY VOLUME, WET	280.7	192.4	169.6	58.9	25.1	20.2	19.0
LB. PER 1000 LB. OF FUEL	19.801	17.007	14.005	6.064	1.885	1.310	1.144
WEIGHT FLOW, LB./HR.	2.079	1.956	1.765	1.534	.656	.524	.487
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	54.9	43.5	30.3	6.3	1.8	1.8	1.5
LB. PER 1000 LB. OF FUEL	3.895	2.198	1.430	.370	.077	.067	.052
WEIGHT FLOW, LB./HR.	.325	.253	.180	.094	.027	.027	.022
RATIO LB HC/LB CO	.1563	.1292	.1021	.0611	.0410	.0506	.0458
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	17.1	21.1	25.4	45.5	84.7	102.5	112.5
LB. PER 1000 LB. OF FUEL	2.771	3.063	3.445	7.689	10.451	10.892	11.101
WEIGHT FLOW, LB./HR.	.291	.352	.434	1.945	3.637	4.357	4.729
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.7	6.6	6.4	13.9	7.8	8.8	8.5
LB. PER 1000 LB. OF FUEL	1.086	.958	.868	2.197	.956	.850	.839
WEIGHT FLOW, LB./HR.	.114	.110	.109	.556	.333	.340	.357
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.8	27.7	31.8	58.5	92.5	110.5	121.0
LB. PER 1000 LB. OF FUEL	3.856	4.022	4.313	9.886	11.407	11.742	11.940
WEIGHT FLOW, LB./HR.	.405	.463	.543	2.501	3.970	4.697	5.086
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00717	.00719	.00712	.00718	.00714	.00707	.00703
SMOKE NUMBER	4.70	1.20	2.30	4.70	7.00	7.00	5.80
CORRECTED WEIGHT FLOW	.02152	.02156	.02156	.02153	.02141	.02121	.02109
SMOKE NUMBER	5.80	5.80	4.70	11.60	14.80	12.80	11.60
CORRECTED WEIGHT FLOW	.03597	.03594	.03594	.03568	.03561	.03528	.03515
SMOKE NUMBER	8.10	8.10	5.80	15.10	19.80	19.80	17.40
CORRECTED WEIGHT FLOW	.05022	.05031	.05031	.05023	.04977	.04939	.04921
SMOKE NUMBER	8.10	8.10	8.10	18.60	24.40	22.10	18.40
SMOKE NUMBER AT WA=0.023	6.70	5.80	5.20	12.50	16.40	15.50	13.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.9 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 6
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.320	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.198	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.455	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.3	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 6 DATE: 10-28-75 TIME: BARO PRESS.: 28.820 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 49.00 PERCENT SPECIFIC HUMIDITY: .005000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	120	121	122	123	124	125	126
ACTUAL POWER SETTING, HORSEPOWER	37.5	51.4	68.1	287.6	478.3	614.9	680.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.51	7.58	10.03	38.41	69.22	90.42	100.03
N1 SPEED, RPM	27530.00	27520.00	27520.00	41730.00	41750.00	41760.00	41710.00
FUEL FLOW (MEAS.) LB./HR.	107.8	116.8	127.8	257.8	342.8	405.8	427.8
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.9	7.8	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	57.00	57.00	60.00	58.00	59.00	59.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.16	14.16	14.16	14.16	14.16	14.16	14.16
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.79	48.23	48.48	133.10	140.47	144.65	143.76
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	325.00	324.00	325.00	651.00	660.00	666.00	668.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	895.0	942.0	1014.0	1103.0	1314.0	1436.0	1492.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.12	14.12	14.04	14.04	14.09	14.10
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	52.500	45.000	36.900	6.300	1.800	1.500	1.500
CARBON MONOXIDE (CO), PPMV	194.717	187.820	179.145	62.714	28.767	21.865	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	25.000	28.000	32.100	60.100	89.750	107.750	119.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.851	2.213	2.462	1.972	2.667	3.101	3.303
NITRIC OXIDE (NO), PPMV	17.700	21.000	26.000	46.700	82.500	102.000	112.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.981	2.289	1.705	.365	.077	.055	.052
CARBON MONOXIDE (CO)	18.827	16.711	14.476	6.368	2.147	1.414	.961
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.971	4.892	4.261	10.012	11.888	11.449	11.948
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.318	.265	.216	.894	.026	.022	.022
CARBON MONOXIDE (CO)	2.014	1.938	1.839	1.635	.734	.573	.410
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.425	.475	.541	2.573	3.762	4.637	5.102
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.38	99.41	99.51	99.82	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0099	.0108	.0118	.0094	.0126	.0147	.0157

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 6
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	104.770	104.770	254.107	402.827	427.097	
FUEL MASS, LB	12.223	33.177	19.058	16.784	3.559	84.802
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.072	3.072	.363	.050	.053	1.738
RATE, LB HC/HR	.322	.322	.092	.020	.023	.264
MASS, LB HC	.038	.102	.007	.001	.000	.147
MASS, PERCENT OF TOTAL CYCLE	25.5	69.1	4.7	.6	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.320
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.388	19.388	6.405	1.399	.967	12.137
RATE, LB CO/HR	2.031	2.031	1.628	.563	.413	1.843
MASS, LB CO	.237	.643	.122	.023	.003	1.029
MASS, PERCENT OF TOTAL CYCLE	23.0	62.5	11.9	2.3	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.198
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.930	3.930	9.894	11.396	11.951	7.085
RATE, LB NOX/HR	.412	.412	2.514	4.591	5.104	1.076
MASS, LB NOX	.048	.130	.189	.191	.043	.601
MASS, PERCENT OF TOTAL CYCLE	8.0	21.7	31.4	31.8	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.455

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.4	34.2
HC (IDLE)	3.1	6.7
NOX (TAKEOFF)	12.0	23.1

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 6
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEN PT,F= 40. REL HUM= 49.00 SPEC HUM= .005000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	120	121	122	123	124	125	126
PERCENT MAX. CORRECTED POWER	5.5	7.6	10.0	30.4	69.2	90.4	100.0
CORRECTED SHAFT HP	38.9	53.5	70.8	214.7	488.7	638.4	706.2
MEASURED SHAFT HP	37.5	51.4	68.1	207.0	470.3	614.9	680.3
SHAFT SPEED, N1, RPM	27530.0	27520.0	27520.0	41730.0	41750.0	41760.0	41710.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	57.0	57.0	60.0	58.0	59.0	59.0
COMPRESSOR DSCHG. PRES.,PSIA	47.8	48.2	48.5	133.1	140.5	144.6	143.8
COMPRESSOR DSCHG. TEMP,DEG F	325.0	324.0	325.0	651.0	660.0	666.0	668.0
TURB INTERSTAGE TEMP., DEG.F	895.0	942.0	1014.0	1103.0	1314.0	1436.0	1492.0
CORR BELLMTH FLOW, LB/SEC	2.94	2.92	2.83	7.65	7.83	7.81	7.79
FA RATIO BASED ON BELLMTH.	.0105	.0114	.0129	.0094	.0126	.0150	.0158
MEASURED FUEL FLOW, LB/HR	107.0	116.0	127.0	257.0	342.0	405.0	427.0
FA RATIO CALC. FROM EMISSION	.0099	.0108	.0118	.0094	.0128	.0147	.0157
EQUIVALENCE RATIO	.145	.158	.173	.138	.188	.216	.238
LOADING W/P**N/V/E(T/540)	.323	.317	.304	.079	.070	.066	.066
COMB EFFIC FROM EMISSIONS	99.303	99.406	99.510	99.818	99.943	99.962	99.973

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.05	2.23	2.46	1.97	2.69	3.10	3.30
LB. CO2 PER LB. OF FUEL	3.12	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	333.5	362.1	397.1	807.8	1077.5	1276.4	1346.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	194.7	187.8	179.1	62.7	28.8	21.9	15.6
LB. PER 1000 LB. OF FUEL	18.627	16.711	14.479	6.360	2.147	1.414	.961
WEIGHT FLOW, LB./HR.	2.814	1.938	1.839	1.635	.734	.573	.418
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	52.5	45.0	36.9	6.3	1.8	1.5	1.5
LB. PER 1000 LB. OF FUEL	2.901	2.289	1.705	.365	.077	.055	.052
WEIGHT FLOW, LB./HR.	.310	.265	.216	.094	.026	.022	.022
RATIO LB HC/LB CO	.1541	.1369	.1177	.0574	.0358	.0392	.0542
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	17.7	21.0	26.8	46.7	82.5	102.0	112.5
LB. PER 1000 LB. OF FUEL	2.811	3.069	3.452	7.780	10.112	10.838	11.225
WEIGHT FLOW, LB./HR.	.301	.356	.438	1.999	3.456	4.390	4.793
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	7.3	7.8	6.1	13.4	7.3	5.8	7.3
LB. PER 1000 LB. OF FUEL	1.159	1.023	.810	2.232	.889	.611	.723
WEIGHT FLOW, LB./HR.	.124	.119	.103	.574	.304	.247	.309
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	25.0	28.8	32.1	60.1	89.7	107.7	119.7
LB. PER 1000 LB. OF FUEL	3.971	4.092	4.261	10.012	11.000	11.449	11.948
WEIGHT FLOW, LB./HR.	.425	.475	.541	2.573	3.762	4.637	5.102
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00703	.00703	.00704	.00704	.00704	.00704	.00706
SMOKE NUMBER	4.70	3.50	3.50	2.30	7.00	8.10	4.70
CORRECTED WEIGHT FLOW	.02110	.02110	.02113	.02113	.02117	.02117	.02117
SMOKE NUMBER	3.50	4.70	4.70	9.30	16.30	11.60	14.00
CORRECTED WEIGHT FLOW	.03516	.03522	.03522	.03522	.03529	.03535	.03529
SMOKE NUMBER	5.80	7.00	4.70	12.80	18.60	18.60	18.60
CORRECTED WEIGHT FLOW	.04922	.04931	.04931	.04940	.04940	.04949	.04940
SMOKE NUMBER	9.30	7.00	7.00	17.40	26.70	23.30	20.90
SMOKE NUMBER AT WA=0.023	5.90	5.60	5.00	10.60	17.30	15.50	14.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 7
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.041	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.859	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.769	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	18.1	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 7 DATE: 10-28-75 TIME: BARO PRESS.: 28.860 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	127	128	129	130	131	132	133
ACTUAL POWER SETTING, HORSEPOWER	34.3	52.5	67.8	203.4	476.2	633.0	683.0
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.04	7.70	9.96	29.86	69.87	93.04	100.38
N1 SPEED, RPM	27560.00	27530.00	27530.00	41710.00	41720.00	41720.00	41690.00
FUEL FLOW (MEAS.) LB./HR.	106.0	119.0	130.0	260.0	355.0	407.0	436.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	7.9	7.8	7.9	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	59.00	58.00	59.00	60.00	58.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.28	48.62	49.12	133.50	140.96	145.48	147.35
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	318.00	318.00	314.00	639.00	650.00	655.00	656.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	868.0	938.0	987.0	1097.0	1315.0	1442.0	1487.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.14	14.15	14.06	14.07	14.11	14.12
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	67.500	47.400	45.600	6.600	2.700	2.400	1.500
CARBON MONOXIDE (CO), PPMV	210.993	198.415	191.953	69.446	32.851	23.890	21.057
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.400	25.900	28.000	55.600	86.500	102.750	110.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.991	2.228	2.416	1.977	2.714	3.159	3.327
NITRIC OXIDE (NO), PPMV	15.200	20.000	22.800	41.300	79.800	94.750	104.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.837	2.414	2.144	.382	.114	.087	.052
CARBON MONOXIDE (CO)	20.981	17.682	15.798	7.024	2.427	1.517	1.270
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.659	3.791	3.784	9.271	18.495	18.715	18.694
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.407	.287	.279	.099	.040	.035	.023
CARBON MONOXIDE (CO)	2.224	2.104	2.053	1.826	.861	.617	.554
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.388	.451	.492	2.411	3.726	4.361	4.750
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.17	99.37	99.44	99.80	99.93	99.96	99.97
F/A (EMISSIONS,CALC)	.0096	.0107	.0116	.0095	.0129	.0150	.0158

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 7
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	105.782	105.782	261.006	391.399	435.344	
FUEL MASS, LB	12.341	33.498	19.575	16.308	3.628	85.351
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.876	3.876	.348	.534	.019	2.264
RATE, LB HC/HR	.410	.410	.091	.209	.008	.346
MASS, LB HC	.048	.130	.007	.009	.000	.193
MASS, PERCENT OF TOTAL CYCLE	24.7	67.2	3.5	4.5	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.041
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.049	21.049	6.981	1.757	1.268	13.295
RATE, LB CO/HR	2.227	2.227	1.822	.688	.548	2.032
MASS, LB CO	.260	.705	.137	.029	.005	1.135
MASS, PERCENT OF TOTAL CYCLE	22.9	62.1	12.0	2.5	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.859
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.653	3.653	9.320	10.277	10.946	6.528
RATE, LB NOX/HR	.386	.386	2.432	4.022	4.765	.998
MASS, LB NOX	.045	.122	.182	.168	.040	.557
MASS, PERCENT OF TOTAL CYCLE	8.1	22.0	32.7	30.1	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.769

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	21.0	33.4
HC (IDLE)	3.9	6.5
NOX (TAKEOFF)	18.9	24.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

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********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 7
RAT SHP= 796. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	127	128	129	130	131	132	133
PERCENT MAX. CORRECTED POWER	5.0	7.7	10.0	29.9	69.9	93.0	100.4
CORRECTED SHAFT HP	35.6	54.4	70.3	210.8	493.3	656.9	708.7
MEASURED SHAFT HP	34.3	52.5	67.8	203.4	476.2	633.8	683.8
SHAFT SPEED, N1, RPM	27568.0	27530.0	27530.0	41710.0	41720.0	41720.0	41698.8
COMPRESSOR INLET TEMP.,DEG.F	59.0	59.0	58.0	59.0	60.0	58.0	58.8
COMPRESSOR DSCHG. PRES.,PSIA	48.3	48.6	49.1	133.5	141.0	145.5	147.3
COMPRESSOR DSCHG. TEMP,DEG F	318.0	318.0	314.0	639.0	650.0	655.0	656.0
TURB INTERSTAGE TEMP., DEG.F	868.0	938.0	987.0	1097.0	1315.0	1442.0	1487.0
CORR BELLMTH FLOW, LB/SEC	2.98	2.94	2.91	7.88	7.83	7.86	7.84
FA RATIO BASED ON BELLMTH.	.0103	.0117	.0129	.0095	.0131	.0149	.0160
MEASURED FUEL FLOW, LB/HR	106.0	119.0	130.0	260.0	355.0	407.0	436.0
FA RATIO CALC. FROM EMISSION	.0096	.0107	.0116	.0095	.0129	.0150	.0158
EQUIVALENCE RATIO	.141	.157	.170	.139	.189	.220	.231
LOADING W/P**N/V/E(T/540)	.326	.318	.312	.080	.071	.067	.065
COMB EFFIC FROM EMISSIONS	99.170	99.372	99.440	99.801	99.933	99.957	99.966

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.99	2.23	2.42	1.98	2.71	3.16	3.33
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	329.7	371.2	406.0	816.9	1118.2	1282.6	1374.2
CARBON MONOXIDE							
PPM BY VOLUME, WET	211.0	198.4	192.0	69.4	32.9	23.9	21.1
LB. PER 1000 LB. OF FUEL	20.981	17.682	15.790	7.024	2.427	1.517	1.278
WEIGHT FLOW, LB./HR.	2.224	2.104	2.053	1.826	.861	.617	.554
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	67.5	47.4	45.6	6.6	2.7	2.4	1.5
LB. PER 1000 LB. OF FUEL	3.837	2.414	2.144	.382	.114	.087	.052
WEIGHT FLOW, LB./HR.	.407	.287	.279	.099	.040	.035	.023
RATIO LB HC/LB CO	.1829	.1365	.1358	.0543	.0470	.0574	.0407
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	15.2	20.0	22.8	41.3	79.8	94.7	104.5
LB. PER 1000 LB. OF FUEL	2.483	2.928	3.081	6.862	9.682	9.888	10.349
WEIGHT FLOW, LB./HR.	.263	.348	.401	1.784	3.437	4.021	4.512
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	7.2	5.9	5.2	14.5	6.7	8.0	5.5
LB. PER 1000 LB. OF FUEL	1.176	.864	.703	2.409	.813	.834	.545
WEIGHT FLOW, LB./HR.	.125	.103	.091	.626	.289	.340	.237
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.4	25.9	28.0	55.8	86.5	102.7	110.0
LB. PER 1000 LB. OF FUEL	3.659	3.791	3.784	9.271	10.495	10.715	10.894
WEIGHT FLOW, LB./HR.	.388	.451	.492	2.411	3.726	4.361	4.750
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00706	.00713	.00715	.00715	.00716	.00716	.00717
SMOKE NUMBER	3.50	4.70	4.70	5.80	5.80	6.10	7.00
CORRECTED WEIGHT FLOW	.02124	.02139	.02144	.02144	.02148	.02148	.02152
SMOKE NUMBER	5.80	4.70	5.80	10.50	17.40	14.00	14.00
CORRECTED WEIGHT FLOW	.03546	.03572	.03573	.03573	.03579	.03586	.03586
SMOKE NUMBER	9.30	5.80	4.70	16.30	22.10	18.60	19.80
CORRECTED WEIGHT FLOW	.04973	.05001	.05011	.05002	.05011	.05021	.05021
SMOKE NUMBER	10.50	8.10	7.00	18.60	26.70	24.40	28.90
SMOKE NUMBER AT WA=0.823	7.30	5.80	5.50	12.80	18.10	16.30	15.40

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 7
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.816	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.986	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.050	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	18.6	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 659082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 7 DATE: 10-28-75 TIME: BARO PRESS.: 28.868 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	134	135	136	137	138	139	140
ACTUAL POWER SETTING, HORSEPOWER	34.5	51.2	67.7	199.4	475.3	612.7	680.6
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.07	7.52	9.93	29.31	69.87	90.06	100.04
N1 SPEED, RPM	27550.00	27550.00	27550.00	41730.00	41730.00	41750.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	100.0	119.0	131.0	262.0	356.0	410.0	436.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	7.9	7.9	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	58.00	60.00	58.00	58.00	58.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.13	48.62	48.87	134.09	141.78	145.53	147.58
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	320.00	318.00	322.00	639.00	648.00	655.00	657.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	880.0	931.0	1000.0	1094.0	1311.0	1429.0	1482.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.14	14.15	14.06	14.06	14.11	14.12
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	64.500	49.500	36.900	7.500	2.400	1.500	1.200
CARBON MONOXIDE (CO), PPMV	225.166	206.316	186.904	73.247	34.080	24.701	22.675
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.500	25.100	29.500	54.900	84.500	101.500	110.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.037	2.213	2.457	1.995	2.709	3.107	3.321
NITRIC OXIDE (NO), PPMV	16.000	19.000	23.000	41.100	77.000	95.250	104.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.582	2.537	1.708	.438	.102	.055	.041
CARBON MONOXIDE (CO)	21.874	16.497	15.131	7.339	2.522	1.595	1.369
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.590	3.696	3.923	9.035	10.273	10.764	10.913
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.387	.302	.224	.113	.036	.023	.018
CARBON MONOXIDE (CO)	2.362	2.201	1.982	1.923	.898	.654	.597
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.388	.448	.514	2.367	3.657	4.413	4.758
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.17	99.34	99.49	99.79	99.93	99.96	99.96
F/A (EMISSIONS,CALC)	.0099	.0107	.0118	.0096	.0129	.0148	.0158

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-28-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 7
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	786.000	
HP-HR	4.118	11.176	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	107.719	107.719	266.778	409.726	436.049	
FUEL MASS, LB	12.567	34.111	20.008	17.072	3.634	87.392
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.612	3.612	.461	.053	.044	2.047
RATE, LB HC/HR	.389	.389	.123	.022	.019	.320
MASS, LB HC	.045	.123	.009	.001	.000	.179
MASS, PERCENT OF TOTAL CYCLE	25.4	68.9	5.2	.5	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.816
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.958	21.958	7.465	1.582	1.387	13.884
RATE, LB CO/HR	2.365	2.365	1.991	.648	.605	2.161
MASS, LB CO	.276	.749	.149	.027	.005	1.206
MASS, PERCENT OF TOTAL CYCLE	22.9	62.1	12.4	2.2	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.986
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.588	3.588	9.287	10.758	10.918	6.588
RATE, LB NOX/HR	.387	.387	2.456	4.408	4.761	1.038
MASS, LB NOX	.045	.122	.184	.184	.040	.575
MASS, PERCENT OF TOTAL CYCLE	7.8	21.3	32.0	31.9	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.050

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	22.8	32.6
HC (IDLE)	3.6	6.4
NOX (TAKEOFF)	10.9	22.9

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 859082-4 FUEL= AV. KERO. TEST NO.= 7
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO.L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	134	135	136	137	138	139	140
PERCENT MAX. CORRECTED POWER	5.1	7.5	9.9	29.3	69.9	90.1	100.0
CORRECTED SHAFT HP	35.8	53.1	70.1	207.0	493.3	635.8	706.3
MEASURED SHAFT HP	34.5	51.2	67.7	199.4	475.3	612.7	680.6
SHAFT SPEED, N1, RPM	27550.0	27550.0	27550.0	41730.0	41730.0	41750.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	58.0	60.0	58.0	58.0	58.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	48.1	48.6	48.9	134.1	141.7	145.5	147.5
COMPRESSOR DSCHG. TEMP,DEG F	328.0	318.8	322.0	639.0	648.8	655.8	657.0
TURB INTERSTAGE TEMP., DEG.F	880.0	931.0	1000.0	1094.0	1311.0	1429.0	1482.0
CORR BELLMTH FLOW, LB/SEC	2.98	2.93	2.88	7.89	7.85	7.85	7.84
FA RATIO BASED ON BELLMTH.	.0184	.0117	.0131	.0095	.0130	.0150	.0160
MEASURED FUEL FLOW, LB/HR	108.8	119.0	131.0	262.0	356.0	418.8	436.0
FA RATIO CALC. FROM EMISSION	.0099	.0107	.0118	.0096	.0129	.0148	.0158
EQUIVALENCE RATIO	.145	.156	.173	.140	.189	.216	.231
LOADING W/P**N/V/E(T/540)	.327	.318	.306	.080	.071	.067	.065
COMB EFFIC FROM EMISSIONS	99.171	99.342	99.494	99.798	99.932	99.958	99.964

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.04	2.21	2.46	2.88	2.71	3.11	3.32
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	335.9	371.0	409.5	823.0	1121.3	1292.1	1374.2
CARBON MONOXIDE							
PPM BY VOLUME, WET	225.2	206.3	166.9	73.2	34.1	24.7	22.7
LB. PER 1000 LB. OF FUEL	21.874	18.497	15.131	7.339	2.522	1.595	1.369
WEIGHT FLOW, LB./HR.	2.362	2.281	1.982	1.923	.898	.654	.597
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	64.5	49.5	36.9	7.5	2.4	1.5	1.2
LB. PER 1000 LB. OF FUEL	3.582	2.537	1.788	.438	.102	.055	.041
WEIGHT FLOW, LB./HR.	.387	.302	.224	.113	.036	.023	.018
RATIO LB HC/LB CO	.1637	.1371	.1128	.0585	.0403	.0347	.0302
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	16.8	19.8	23.8	41.1	77.8	95.2	104.2
LB. PER 1000 LB. OF FUEL	2.553	2.798	3.165	6.764	9.361	10.101	10.343
WEIGHT FLOW, LB./HR.	.276	.333	.415	1.772	3.332	4.142	4.509
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.5	6.1	5.7	13.8	7.5	6.3	5.8
LB. PER 1000 LB. OF FUEL	1.037	.898	.758	2.271	.912	.663	.578
WEIGHT FLOW, LB./HR.	.112	.107	.099	.595	.325	.272	.249
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.5	25.1	29.5	54.9	84.5	101.5	110.0
LB. PER 1000 LB. OF FUEL	3.590	3.696	3.923	9.035	10.273	10.764	10.913
WEIGHT FLOW, LB./HR.	.388	.440	.514	2.367	3.657	4.413	4.758
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00719	.00717	.00717	.00719	.00719	.00720	.00721
SMOKE NUMBER	3.50	1.20	3.50	5.80	7.00	8.10	7.00
CORRECTED WEIGHT FLOW	.02156	.02156	.02152	.02156	.02160	.02164	.02164
SMOKE NUMBER	5.80	5.80	3.50	12.80	15.10	14.00	11.60
CORRECTED WEIGHT FLOW	.03593	.03586	.03586	.03593	.03599	.03606	.03606
SMOKE NUMBER	5.80	7.00	7.00	15.10	24.40	28.90	19.00
CORRECTED WEIGHT FLOW	.05021	.05021	.05030	.05030	.05039	.05049	.05049
SMOKE NUMBER	9.30	7.00	8.10	20.90	27.90	23.30	25.60
SMOKE NUMBER AT WA=0.823	6.10	5.20	5.50	13.70	18.60	16.50	16.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 7
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.673	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.634	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.899	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	18.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869382-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLES
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 7 DATE: 10-29-75 TIME: BARO PRESS.: 28.980 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 380.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	141	142	143	144	145	146	147
ACTUAL POWER SETTING, HORSEPOWER	34.8	58.6	78.8	208.4	476.1	613.1	679.4
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.98	7.42	10.26	30.54	69.82	89.40	99.45
N1 SPEED, RPM	27540.00	27520.00	27540.00	41760.00	41750.00	41740.00	41720.00
FUEL FLOW (MEAS.) LB./HR.	108.0	117.0	132.0	259.0	356.0	485.0	431.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	7.8	7.9	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	56.00	57.00	56.00	57.00	56.00	62.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.23	14.23	14.23	14.23	14.23	14.23	14.23
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.62	48.82	49.51	134.68	142.44	145.24	147.99
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	317.00	317.00	318.00	653.00	648.00	658.00	657.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	873.0	932.0	1000.0	1103.0	1306.0	1435.0	1478.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.20	14.20	14.20	14.11	14.13	14.17	14.18
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	59.700	42.600	36.000	6.600	2.700	1.500	1.200
CARBON MONOXIDE (CO), PPMV	206.782	192.413	178.691	61.036	27.546	19.846	19.442
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.000	25.000	28.900	56.000	82.500	100.250	107.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.963	2.175	2.488	2.000	2.747	3.089	3.267
NITRIC OXIDE (NO), PPMV	15.200	15.500	22.900	42.500	75.000	95.000	102.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.442	2.223	1.646	.377	.113	.056	.042
CARBON MONOXIDE (CO)	28.861	17.578	14.295	6.105	2.011	1.283	1.194
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.646	3.758	3.798	9.281	9.894	10.693	10.844
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.372	.268	.217	.098	.048	.023	.018
CARBON MONOXIDE (CO)	2.253	2.056	1.887	1.581	.716	.522	.515
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.394	.439	.501	2.383	3.522	4.331	4.674
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.21	99.39	99.52	99.82	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0095	.0105	.0119	.0096	.0131	.0147	.0155

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 7
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.116	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	108.043	108.043	256.424	406.501	432.607	
FUEL MASS, LB	12.605	34.214	19.232	16.938	3.605	86.593
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.432	3.432	.445	.812	.125	1.962
RATE, LB HC/HR	.371	.371	.114	.005	.054	.304
MASS, LB HC	.043	.117	.009	.008	.000	.178
MASS, PERCENT OF TOTAL CYCLE	25.5	69.1	5.0	.1	.3	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.673
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	20.839	20.839	6.177	1.286	1.179	12.948
RATE, LB CO/HR	2.252	2.252	1.584	.523	.510	2.007
MASS, LB CO	.263	.713	.119	.022	.004	1.128
MASS, PERCENT OF TOTAL CYCLE	23.4	63.6	10.6	1.9	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.634
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.647	3.647	9.013	10.797	10.678	6.538
RATE, LB NOX/HR	.394	.394	2.311	4.389	4.619	1.013
MASS, LB NOX	.046	.125	.173	.183	.038	.565
MASS, PERCENT OF TOTAL CYCLE	8.1	22.1	30.7	32.3	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.899

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	28.8	33.3
HC (IDLE)	3.4	6.5
NOX (TAKEOFF)	10.7	22.9

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 7

RAT SHP= 786. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500

FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	141	142	143	144	145	146	147
PERCENT MAX. CORRECTED POWER	5.0	7.4	10.3	30.5	69.8	89.4	99.4
CORRECTED SHAFT HP	35.2	52.4	72.5	215.6	493.0	631.1	702.1
MEASURED SHAFT HP	34.0	50.6	70.0	208.4	476.1	613.1	679.4
SHAFT SPEED, N1, RPM	27540.0	27520.0	27540.0	41760.0	41750.0	41740.0	41720.0
COMPRESSOR INLET TEMP.,DEG.F	56.0	57.0	56.0	57.0	56.0	62.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	48.6	48.8	49.5	134.7	142.4	145.2	148.0
COMPRESSOR DSCHG. TEMP,DEG F	317.0	317.0	318.0	653.0	648.0	658.0	657.0
TURB INTERSTAGE TEMP., DEG.F	873.0	932.0	1000.0	1103.0	1306.0	1435.0	1478.0
CORR BELMTH FLOW, LB/SEC	2.97	2.98	2.86	7.84	7.87	7.84	7.83
FA RATIO BASED ON BELLMTH.	.0104	.0116	.0132	.0095	.0129	.0149	.0158
MEASURED FUEL FLOW, LB/HR	108.0	117.0	132.0	259.0	356.0	405.0	431.0
FA RATIO CALC. FROM EMISSION	.0095	.0105	.0119	.0096	.0131	.0147	.0155
EQUIVALENCE RATIO	.139	.154	.175	.140	.192	.215	.227
LOADING W/P**N/V/E(T/540)	.325	.314	.302	.077	.071	.067	.065
COMB EFFIC FROM EMISSIONS	99.207	99.392	99.519	99.823	99.943	99.965	99.968

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.96	2.17	2.49	2.88	2.75	3.09	3.27
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	336.1	365.1	412.8	814.1	1121.6	1276.5	1358.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	286.8	192.4	178.7	61.0	27.5	19.8	19.4
LB. PER 1000 LB. OF FUEL	20.861	17.578	14.295	6.105	2.811	1.289	1.194
WEIGHT FLOW, LB./HR.	2.253	2.056	1.887	1.581	.716	.522	.515
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	59.7	42.6	36.0	6.6	2.7	1.5	1.2
LB. PER 1000 LB. OF FUEL	3.442	2.223	1.646	.377	.113	.056	.042
WEIGHT FLOW, LB./HR.	.372	.260	.217	.098	.040	.023	.018
RATIO LB HC/LB CO	.1650	.1265	.1152	.0618	.0560	.0432	.0353
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	15.2	18.5	22.9	42.5	75.8	95.0	102.5
LB. PER 1000 LB. OF FUEL	2.519	2.775	3.089	6.983	8.994	10.133	10.348
WEIGHT FLOW, LB./HR.	.272	.325	.397	1.809	3.202	4.104	4.456
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.8	6.5	6.8	13.5	7.5	5.2	5.8
LB. PER 1000 LB. OF FUEL	1.127	.975	.788	2.218	.699	.568	.584
WEIGHT FLOW, LB./HR.	.122	.114	.104	.574	.320	.227	.217
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.8	25.8	28.9	56.0	82.5	100.2	107.5
LB. PER 1000 LB. OF FUEL	3.646	3.750	3.798	9.201	9.694	10.693	10.844
WEIGHT FLOW, LB./HR.	.394	.439	.501	2.383	3.522	4.331	4.674
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00726	.00724	.00721	.00717	.00716	.00715	.00713
SMOKE NUMBER	4.70	4.70	3.50	7.80	8.10	8.10	8.10
CORRECTED WEIGHT FLOW	.02179	.02171	.02163	.02152	.02148	.02144	.02140
SMOKE NUMBER	7.00	5.80	4.70	14.00	15.10	15.10	14.00
CORRECTED WEIGHT FLOW	.03632	.03619	.03605	.03586	.03579	.03573	.03566
SMOKE NUMBER	8.10	8.10	5.80	19.80	23.30	18.60	19.80
CORRECTED WEIGHT FLOW	.05085	.05066	.05038	.05021	.05011	.05002	.04993
SMOKE NUMBER	9.30	7.00	5.80	22.10	29.10	24.40	23.30
SMOKE NUMBER AT WA=0.023	7.20	6.40	4.90	15.70	18.90	16.60	16.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX CACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 8
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.714	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.726	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.477	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.6	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 8.0 HR TIME SINCE ENGINE OVERHAUL: 8.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 8 DATE: 10-29-75 TIME: BARO PRESS.: 28.980 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 380.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	148	149	150	151	152	153	154
ACTUAL POWER SETTING, HORSEPOWER	34.8	58.5	68.3	202.1	475.7	613.4	688.2
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.97	7.39	9.98	29.61	69.58	89.71	99.56
N1 SPEED, RPM	27520.00	27530.00	27530.00	41760.00	41720.00	41730.00	41720.00
FUEL FLOW (MEAS.) LB./HR.	108.5	117.0	130.0	261.0	354.0	405.0	431.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	2.9	7.9	7.8	7.9	7.9
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	58.00	57.00	60.00	57.00	60.00	59.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.23	14.23	14.23	14.23	14.23	14.23	14.23
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.77	49.36	49.71	135.17	141.70	146.37	149.17
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	311.00	310.00	310.00	631.00	641.00	647.00	648.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	857.0	919.0	1008.0	1090.0	1310.0	1425.0	1472.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.28	14.28	14.20	14.12	14.12	14.17	14.18
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	61.500	54.000	39.000	6.600	2.400	2.400	1.200
CARBON MONOXIDE (CO), PPMV	211.931	206.316	168.279	61.036	29.583	28.658	23.079
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.000	23.000	27.600	53.100	73.750	95.250	100.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.089	2.194	2.427	2.835	2.709	3.124	3.327
NITRIC OXIDE (NO), PPMV	13.000	16.000	21.100	40.000	72.000	89.000	95.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.465	2.791	1.827	.376	.102	.088	.041
CARBON MONOXIDE (CO)	20.888	18.655	15.431	6.891	2.198	1.326	1.391
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.488	3.416	3.716	8.704	9.697	10.046	9.977
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.374	.327	.238	.098	.036	.036	.018
CARBON MONOXIDE (CO)	2.256	2.183	2.006	1.590	.775	.537	.600
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.367	.488	.483	2.272	3.433	4.068	4.308
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.28	99.32	99.48	99.82	99.94	99.96	99.96
F/A (EMISSIONS,CALC)	.0097	.0106	.0117	.0096	.0129	.0148	.0158

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 8
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	186.085	186.085	263.259	485.968	431.592	
FUEL MASS, LB	12.618	34.227	19.744	16.915	3.597	87.093
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.468	3.468	.423	.112	.039	1.980
RATE, LB HC/HR	.374	.374	.111	.046	.017	.369
MASS, LB HC	.044	.118	.008	.002	.000	.172
MASS, PERCENT OF TOTAL CYCLE	25.3	68.7	4.6	1.1	.1	100.8
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.714
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	28.871	28.871	6.131	1.377	1.236	12.932
RATE, LB CO/HR	2.256	2.256	1.614	.559	.533	2.017
MASS, LB CO	.263	.714	.121	.023	.004	1.126
MASS, PERCENT OF TOTAL CYCLE	23.4	63.4	10.7	2.1	.4	100.8
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.726
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.398	3.398	8.798	10.066	9.911	6.184
RATE, LB NOX/HR	.367	.367	2.314	4.886	4.278	.965
MASS, LB NOX	.043	.116	.174	.170	.036	.539
MASS, PERCENT OF TOTAL CYCLE	8.0	21.6	32.2	31.6	6.6	100.8
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.477

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	28.9	33.2
HC (IDLE)	3.5	6.4
NOX (TAKEOFF)	9.9	23.4

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

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********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 8

RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 57. REL HUM= 95.00 SPEC HUM= .010008

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO.,/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	148	149	150	151	152	153	154
PERCENT MAX. CORRECTED POWER	5.0	7.4	10.0	29.6	69.5	89.7	99.6
CORRECTED SHAFT HP	35.1	52.2	70.4	209.1	490.7	633.3	702.9
MEASURED SHAFT HP	34.0	50.5	68.3	202.1	475.7	613.4	680.2
SHAFT SPEED, N1, RPM	27520.0	27530.0	27530.0	41769.0	41720.0	41738.0	41720.0
COMPRESSOR INLET TEMP.,DEG.F	58.0	57.0	60.0	57.0	60.0	59.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	46.8	49.4	49.7	135.2	141.7	146.4	149.2
COMPRESSOR DSCHG. TEMP.,DEG F	311.0	310.0	310.0	631.0	641.0	647.0	648.0
TURB INTERSTAGE TEMP., DEG.F	857.0	919.3	1000.0	1090.0	1310.0	1425.0	1472.0
CORR BELLMTH FLOW, LB/SEC	3.00	2.98	2.89	7.89	7.83	7.86	7.88
FA RATIO BASED ON BELLMTH.	.0103	.0112	.0129	.0095	.0130	.0147	.0157
MEASURED FUEL FLOW, LB/HR	108.0	117.0	130.0	261.0	354.0	405.0	431.0
FA RATIO CALC. FROM EMISSION	.0097	.0106	.0117	.0096	.0129	.0146	.0156
EQUIVALENCE RATIO	.142	.155	.171	.141	.189	.218	.231
LOADING W/P**N/V/E(T/540)	.329	.321	.306	.080	.072	.068	.065
COMB EFFIC FROM EMISSIONS	99.285	99.316	99.477	99.824	99.948	99.961	99.964

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.01	2.19	2.43	2.80	2.71	3.12	3.33
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	336.1	364.7	406.2	820.4	1115.2	1276.5	1358.4
CARBON MONOXIDE							
PPM BY VOLUME, WET	211.9	206.3	188.3	61.8	29.6	28.7	23.1
LB. PER 1000 LB. OF FUEL	28.888	18.659	15.431	6.091	2.190	1.326	1.391
WEIGHT FLOW, LB./HR.	2.256	2.183	2.006	1.590	.775	.537	.600
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	61.5	54.0	39.0	6.6	2.4	2.4	1.2
LB. PER 1000 LB. OF FUEL	3.465	2.791	1.627	.376	.182	.088	.041
WEIGHT FLOW, LB./HR.	.374	.327	.238	.098	.036	.036	.018
RATIO LB HC/LB CO	.1659	.1496	.1184	.0618	.0464	.0664	.0297
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.0	16.0	21.1	40.0	72.0	89.0	95.0
LB. PER 1000 LB. OF FUEL	2.195	2.376	2.841	6.557	8.754	9.386	9.408
WEIGHT FLOW, LB./HR.	.227	.278	.369	1.711	3.099	3.882	4.055
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	8.8	7.8	6.5	13.1	7.8	6.3	5.7
LB. PER 1000 LB. OF FUEL	1.295	1.040	.875	2.147	.942	.659	.569
WEIGHT FLOW, LB./HR.	.140	.122	.114	.560	.334	.267	.245
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.8	23.8	27.6	53.1	79.7	95.2	100.7
LB. PER 1000 LB. OF FUEL	3.488	3.416	3.716	8.704	9.697	10.046	9.977
WEIGHT FLOW, LB./HR.	.367	.400	.483	2.272	3.433	4.068	4.300
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00713	.00710	.00709	.00706	.00703	.00702	.00700
SMOKE NUMBER	0.00	1.20	2.40	4.70	5.90	5.90	3.50
CORRECTED WEIGHT FLOW	.02136	.02129	.02126	.02119	.02110	.02107	.02100
SMOKE NUMBER	4.70	2.40	3.50	10.60	15.30	11.80	10.60
CORRECTED WEIGHT FLOW	.03564	.03548	.03543	.03532	.03517	.03511	.03499
SMOKE NUMBER	5.90	5.90	3.50	16.50	22.40	17.60	16.50
CORRECTED WEIGHT FLOW	.04989	.04967	.04961	.04945	.04924	.04916	.04899
SMOKE NUMBER	7.10	5.90	7.10	21.20	25.90	24.70	22.40
SMOKE NUMBER AT WA=8.823	4.40	3.98	4.10	13.40	17.60	15.20	13.58

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX ACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 8
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.787	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.108	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.276	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLES
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 8 DATE: 10-29-75 TIME: BARO PRESS.: 28.980 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	155	156	157	158	159	160	161
ACTUAL POWER SETTING, HORSEPOWER	34.0	50.8	67.2	204.2	476.8	616.0	688.1
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.97	7.44	9.83	30.00	69.66	90.50	99.53
N1 SPEED, RPM	27540.00	27520.00	27550.00	41770.00	41740.00	41730.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	107.0	119.0	127.0	263.0	352.0	407.0	431.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	7.9	7.8	7.9	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	61.00	60.00	61.00	57.00	61.00	57.00	61.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.19	14.19	14.19	14.19	14.19	14.19	14.19
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.13	49.02	54.27	135.07	141.65	146.46	147.58
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	320.00	312.00	314.00	632.00	643.00	643.00	652.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	873.0	934.0	997.0	1094.0	1315.0	1421.0	1482.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.16	14.16	14.08	14.09	14.13	14.14
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	64.500	48.000	39.000	6.600	1.200	2.400	1.800
CARBON MONOXIDE (CO), PPMV	208.652	197.027	186.446	56.014	26.325	21.857	18.233
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.000	23.500	28.200	54.000	80.000	95.000	105.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.009	2.213	2.437	2.028	2.752	3.159	3.376
NITRIC OXIDE (NO), PPMV	13.100	17.200	22.100	41.500	73.750	88.500	100.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.634	2.461	1.828	.372	.058	.087	.061
CARBON MONOXIDE (CO)	20.965	17.673	15.218	5.527	1.918	1.337	1.083
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.238	3.462	3.761	8.753	9.576	9.907	10.249
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.389	.293	.231	.898	.018	.035	.026
CARBON MONOXIDE (CO)	2.200	2.103	1.933	1.454	.675	.544	.467
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.346	.412	.480	2.302	3.371	4.032	4.417
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.20	99.37	99.48	99.84	99.95	99.96	99.97
F/A (EMISSIONS,CALC)	.0097	.0107	.0117	.0097	.0131	.0150	.0160

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX .ACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 6
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	107.158	107.158	263.030	403.059	427.418	
FUEL MASS, LB	12.502	33.933	19.727	16.794	3.562	86.518
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.617	3.617	.372	.094	.078	2.047
RATE, LB HC/HR	.388	.388	.098	.038	.030	.317
MASS, LB HC	.045	.123	.007	.002	.000	.177
MASS, PERCENT OF TOTAL CYCLE	25.5	69.3	4.1	.9	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.787
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	20.531	20.531	5.527	1.273	.980	12.565
RATE, LB CO/HR	2.200	2.200	1.454	.513	.398	1.947
MASS, LB CO	.257	.697	.109	.021	.003	1.087
MASS, PERCENT OF TOTAL CYCLE	23.6	64.1	10.0	2.0	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.108
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.248	3.248	8.753	9.892	10.274	6.078
RATE, LB NOX/HR	.347	.347	2.302	3.987	4.392	.942
MASS, LB NOX	.041	.118	.173	.166	.037	.526
MASS, PERCENT OF TOTAL CYCLE	7.7	20.9	32.8	31.6	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.276

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	20.5	33.8
HC (IDLE)	3.6	6.5
NOX (TAKEOFF)	10.3	25.2

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 8

RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 57. REL HUM= 95.00 SPEC HUM= .018000

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	155	156	157	158	159	160	161
PERCENT MAX. CORRECTED POWER	5.0	7.4	9.8	30.0	69.7	90.5	99.5
CORRECTED SHAFT HP	35.1	52.5	69.4	211.8	491.6	638.9	702.7
MEASURED SHAFT HP	34.8	50.8	67.2	204.2	476.0	616.8	680.1
SHAFT SPEED, N1, RPM	27540.0	27520.0	27550.0	41770.0	41740.0	41730.0	41730.0
COMPRESSOR INLET TEMP..DEG.F	61.0	60.0	61.0	57.0	61.0	57.0	61.0
COMPRESSOR DSCHG. PRES.,PSIA	46.1	49.0	54.3	135.1	141.7	146.5	147.5
COMPRESSOR DSCHG. TEMP,DEG F	328.0	312.0	314.0	632.0	643.0	643.0	652.0
TURB INTERSTAGE TEMP., DEG.F	879.0	934.0	997.0	1094.0	1315.0	1421.0	1482.0
CORR BELMTH FLOW, LB/SEC	2.95	2.94	2.92	7.92	7.84	7.86	7.82
FA RATIO BASED ON BELLMTH.	.0184	.0116	.0125	.0095	.0129	.0149	.0159
MEASURED FUEL FLOW, LB/HR	187.0	119.0	127.0	263.0	352.0	407.0	431.0
FA RATIO CALC. FROM EMISSION	.0097	.0107	.0117	.0097	.0131	.0150	.0160
EQUIVALENCE RATIO	.142	.156	.172	.142	.192	.220	.235
LOADING W/P**N/V/E(T/540)	.324	.318	.263	.080	.072	.068	.065
COMB EFFIC FROM EMISSIONS	99.198	99.368	99.482	99.837	99.950	99.961	99.969

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.81	2.21	2.44	2.83	2.75	3.16	3.38
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	333.0	371.2	396.9	827.0	1109.1	1282.8	1358.6
CARBON MONOXIDE							
PPM BY VOLUME, WET	288.7	197.8	186.4	56.8	26.3	21.1	18.2
LB. PER 1000 LB. OF FUEL	28.565	17.673	15.218	5.527	1.916	1.337	1.083
WEIGHT FLOW, LB./HR.	2.280	2.103	1.933	1.454	.675	.544	.467
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	64.5	48.0	39.8	6.6	1.2	2.4	1.8
LB. PER 1000 LB. OF FUEL	3.634	2.461	1.828	.372	.050	.087	.061
WEIGHT FLOW, LB./HR.	.369	.293	.231	.098	.018	.035	.026
RATIO LB HC/LB CO	.1767	.1392	.1196	.0673	.0261	.0651	.0564
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.1	17.2	22.1	41.5	73.6	88.5	100.0
LB. PER 1000 LB. OF FUEL	2.121	2.534	2.963	6.727	8.826	9.229	9.761
WEIGHT FLOW, LB./HR.	.227	.302	.376	1.769	3.107	3.756	4.207
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.9	6.3	6.1	12.5	6.3	6.5	5.8
LB. PER 1000 LB. OF FUEL	1.117	.928	.818	2.026	.748	.678	.488
WEIGHT FLOW, LB./HR.	.120	.110	.104	.533	.263	.276	.210
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.0	23.5	28.2	54.0	80.0	95.0	105.8
LB. PER 1000 LB. OF FUEL	3.238	3.462	3.781	8.753	9.576	9.907	10.249
WEIGHT FLOW, LB./HR.	.346	.412	.480	2.302	3.371	4.032	4.417
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00714	.00711	.00710	.00708	.00785	.00709	.00710
SMOKE NUMBER	1.20	2.40	1.20	1.20	5.90	7.10	3.50
CORRECTED WEIGHT FLOW	.02142	.02134	.02130	.02123	.02115	.02127	.02131
SMOKE NUMBER	3.50	3.50	3.50	11.80	14.10	12.90	9.40
CORRECTED WEIGHT FLOW	.03570	.03557	.03551	.03532	.03526	.03545	.03552
SMOKE NUMBER	6.20	4.70	5.90	17.60	23.50	20.80	17.60
CORRECTED WEIGHT FLOW	.04998	.04980	.04971	.04945	.14936	.04963	.04972
SMOKE NUMBER	8.20	5.90	4.70	18.80	27.10	22.40	22.40
SMOKE NUMBER AT WA=0.023	5.30	4.10	3.80	12.50	17.90	15.70	13.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P84801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 8
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.625	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.805	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.327	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.5	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 8 DATE: 10-29-75 TIME: BARO PRESS.: 28.980 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 95.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	162	163	164	165	166	167	168
ACTUAL POWER SETTING, HORSEPOWER	34.0	50.9	66.8	202.5	474.9	618.9	679.8
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.97	7.47	9.81	29.72	69.64	89.50	99.79
N1 SPEED, RPM	27530.00	27570.00	27600.00	41730.00	41760.00	41738.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	105.0	116.0	123.0	257.0	350.0	405.0	426.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	2.9	7.9	7.9	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	61.00	58.00	57.00	58.00	59.00	60.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.19	14.19	14.19	14.19	14.19	14.19	14.19
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.48	49.31	49.85	134.33	141.94	145.63	148.58
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	312.00	310.00	312.00	632.00	643.00	646.00	648.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	857.0	923.0	978.0	1095.0	1310.0	1427.0	1472.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.16	14.16	14.08	14.09	14.13	14.14
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	60.900	59.100	45.000	8.100	3.300	1.500	2.100
CARBON MONOXIDE (CO), PPMV	218.993	204.451	192.413	61.036	27.953	19.846	19.846
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.400	23.000	26.100	53.000	80.000	95.500	102.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.037	2.213	2.376	2.000	2.725	3.089	3.315
NITRIC OXIDE (NO), PPMV	14.000	16.500	20.200	41.000	74.500	90.000	97.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.385	3.028	2.151	.463	.139	.056	.073
CARBON MONOXIDE (CO)	28.515	18.324	16.094	6.105	2.057	1.289	1.201
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.256	3.386	3.586	8.787	9.678	10.187	10.188
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.355	.351	.265	.119	.049	.023	.031
CARBON MONOXIDE (CO)	2.154	2.126	1.988	1.569	.720	.522	.512
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.342	.393	.441	2.238	3.384	4.126	4.348
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.22	99.30	99.43	99.82	99.94	99.96	99.97
F/A (EMISSIONS,CALC)	.0099	.0107	.0114	.0096	.0130	.0147	.0157

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 8
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	105.156	105.156	260.076	409.075	423.622	
FUEL MASS, LB	12.268	33.299	19.506	17.045	3.530	85.648
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.386	3.386	.524	.132	.002	1.947
RATE, LB HC/HR	.356	.356	.136	.054	.001	.299
MASS, LB HC	.042	.113	.010	.002	.000	.167
MASS, PERCENT OF TOTAL CYCLE	24.9	67.6	6.1	1.3	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.625
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	20.492	20.492	6.114	1.385	1.102	12.616
RATE, LB CO/HR	2.155	2.155	1.590	.567	.467	1.935
MASS, LB CO	.251	.682	.119	.024	.004	1.081
MASS, PERCENT OF TOTAL CYCLE	23.3	63.2	11.0	2.2	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.085
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.260	3.260	8.755	10.202	10.177	6.178
RATE, LB NOX/HR	.343	.343	2.277	4.174	4.311	.948
MASS, LB NOX	.040	.109	.171	.174	.036	.529
MASS, PERCENT OF TOTAL CYCLE	7.6	20.5	32.3	32.9	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.327

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

POLLUTANT	EPA LTO-CYCLE LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.6
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL		
POLLUTANT (MODE)	A	B
CO (IDLE)	28.5	34.1
HC (IDLE)	3.4	6.6
NOX (TAKEOFF)	18.2	24.3

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 8
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 57. REL HUM= 95.00 SPEC HUM= .010000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO,#/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	162	163	164	165	166	167	168
PERCENT MAX. CORRECTED POWER	5.0	7.5	9.8	29.7	69.6	89.5	99.8
CORRECTED SHAFT HP	35.1	52.7	69.3	209.8	491.7	631.9	704.5
MEASURED SHAFT HP	34.8	50.9	66.8	202.5	474.9	610.9	679.8
SHAFT SPEED, N1, RPM	27530.0	27570.0	27600.0	41730.0	41760.0	41730.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	61.0	58.0	57.0	58.0	59.0	60.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	48.5	49.3	49.9	134.3	141.9	145.6	148.6
COMPRESSOR DSCHG. TEMP,DEG F	312.0	310.0	312.0	632.0	643.0	648.0	648.0
TURB INTERSTAGE TEMP.. DEG.F	857.0	923.0	978.0	1095.0	1310.0	1427.0	1472.0
CORR BELMTH FLOW, LB/SEC	2.98	2.96	2.93	7.88	7.85	7.84	7.84
FA RATIO BASED ON BELLMTH.	.0102	.0113	.0120	.0094	.0128	.0149	.0156
MEASURED FUEL FLOW, LB/HR	105.0	116.0	123.0	257.0	350.0	405.0	426.0
FA RATIO CALC. FROM EMISSION	.0099	.0107	.0114	.0096	.0130	.0147	.0157
EQUIVALENCE RATIO	.144	.157	.166	.140	.190	.215	.231
LOADING W/P**N/V/E(T/540)	.328	.318	.308	.081	.072	.068	.065
COMB EFFIC FROM EMISSIONS	99.221	99.303	99.433	99.816	99.939	99.965	99.965

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.84	2.21	2.38	2.88	2.72	3.09	3.32
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	326.8	361.6	384.1	807.8	1102.7	1276.5	1342.7
CARBON MONOXIDE							
PPM BY VOLUME, WET	211.0	204.5	192.4	61.0	28.0	19.8	19.8
LB. PER 1000 LB. OF FUEL	20.515	18.324	16.094	6.185	2.857	1.289	1.281
WEIGHT FLOW, LB./HR.	2.154	2.126	1.980	1.569	.720	.522	.512
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	60.9	59.1	45.0	8.1	3.3	1.5	2.1
LB. PER 1000 LB. OF FUEL	3.385	3.028	2.151	.463	.139	.056	.073
WEIGHT FLOW, LB./HR.	.355	.351	.265	.119	.049	.023	.031
RATIO LB HC/LB CO	.1650	.1652	.1337	.0759	.0675	.0432	.0605
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.8	16.5	20.2	41.0	74.5	90.0	97.5
LB. PER 1000 LB. OF FUEL	2.236	2.429	2.775	6.736	9.885	9.680	9.691
WEIGHT FLOW, LB./HR.	.235	.282	.341	1.731	3.152	3.888	4.129
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.4	6.5	5.9	12.8	5.5	5.5	5.8
LB. PER 1000 LB. OF FUEL	1.022	.957	.811	1.972	.665	.587	.497
WEIGHT FLOW, LB./HR.	.107	.111	.100	.507	.233	.238	.212
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.4	23.0	26.1	53.0	80.0	95.5	102.5
LB. PER 1000 LB. OF FUEL	3.258	3.386	3.586	8.707	9.670	10.187	10.188
WEIGHT FLOW, LB./HR.	.342	.393	.441	2.238	3.384	4.126	4.340
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00712	.00710	.00710	.00710	.00712	.00712	.00712
SMOKE NUMBER	1.20	2.40	1.20	4.70	3.50	5.90	3.50
CORRECTED WEIGHT FLOW	.02135	.02131	.02131	.02131	.02135	.02135	.02135
SMOKE NUMBER	3.50	2.40	1.20	2.40	17.60	11.80	11.80
CORRECTED WEIGHT FLOW	.03552	.03552	.03552	.03552	.03558	.03558	.03558
SMOKE NUMBER	5.90	5.90	5.90	15.30	21.20	18.80	16.50
CORRECTED WEIGHT FLOW	.04963	.04972	.04981	.04972	.04981	.04981	.04990
SMOKE NUMBER	7.10	4.70	5.90	20.00	27.10	27.10	22.40
SMOKE NUMBER AT WA=0.823	4.40	3.80	3.60	12.40	17.50	16.80	13.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V36 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 9
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.055	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	15.219	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.934	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	14.6	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 9 DATE: 10-29-75 TIME: BARO PRESS.: 28.828 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 32.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	169	170	171	172	173	174	175
ACTUAL POWER SETTING, HORSEPOWER	35.8	53.4	71.3	210.1	489.2	626.9	703.8
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.12	7.63	10.19	29.96	69.82	89.55	100.44
N1 SPEED, RPM	27530.00	27510.00	27540.00	41750.00	41730.00	41720.00	41700.00
FUEL FLOW (MEAS.) LB./HR.	108.0	118.0	129.0	254.0	352.0	410.0	436.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.8	2.7	7.6	7.5	7.5	7.5
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	89.00	90.00	90.00	92.00	91.00	90.00	91.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.16	14.16	14.16	14.16	14.16	14.16	14.16
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.56	46.81	47.05	128.78	135.81	139.64	141.21
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	335.00	340.00	344.00	662.00	675.00	681.00	685.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	939.0	1018.0	1096.0	1139.0	1385.0	1507.0	1574.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.10	14.13	14.14	14.85	14.05	14.09	14.10
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	49.500	32.400	23.700	5.700	1.800	1.200	1.200
CARBON MONOXIDE (CO), PPMV	194.717	174.153	160.642	54.762	25.513	21.857	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	23.000	28.000	32.200	59.200	93.200	110.000	122.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.165	2.411	2.719	2.061	2.918	3.389	3.667
NITRIC OXIDE (NO), PPMV	17.900	23.000	27.500	46.500	66.300	105.000	116.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.594	1.529	.993	.316	.071	.041	.038
CARBON MONOXIDE (CO)	17.851	14.374	11.778	5.319	1.754	1.247	.866
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.464	3.736	3.878	9.445	10.523	10.697	10.989
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.280	.180	.128	.080	.025	.017	.016
CARBON MONOXIDE (CO)	1.928	1.696	1.519	1.351	.617	.511	.377
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.374	.448	.500	2.399	3.704	4.386	4.791
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.35	99.53	99.64	99.85	99.95	99.97	99.98
F/A (EMISSIONS,CALC)	.0184	.0116	.0138	.0099	.0139	.0161	.0174

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 9
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	107.534	107.534	254.273	412.248	437.227	
FUEL MASS, LB	12.546	34.852	19.070	17.177	3.644	86.489
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	2.663	2.663	.315	.027	.009	1.518
RATE, LB HC/HR	.286	.286	.080	.011	.004	.234
MASS, LB HC	.033	.091	.006	.000	.000	.131
MASS, PERCENT OF TOTAL CYCLE	25.6	69.4	4.6	.3	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.055
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	18.044	18.044	5.315	1.251	.919	11.161
RATE, LB CO/HR	1.940	1.940	1.351	.516	.402	1.732
MASS, LB CO	.226	.614	.101	.021	.003	.967
MASS, PERCENT OF TOTAL CYCLE	23.4	63.5	10.5	2.2	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						15.219
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.434	3.434	9.459	10.767	11.895	6.541
RATE, LB NOX/HR	.369	.369	2.405	4.439	4.851	1.813
MASS, LB NOX	.043	.117	.180	.185	.040	.566
MASS, PERCENT OF TOTAL CYCLE	7.6	20.7	31.9	32.7	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.904

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	18.0	33.8
HC (IDLE)	2.7	6.5
NOX (TAKEOFF)	11.1	23.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 9
RAT SHP= 786. RA EGT,F= 1058. RAT SPD= 41730. DEW PT,F= 57. REL HUM= 32.00 SPEC HUM= .010000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 398.0 FLO,L/M= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	169	170	171	172	173	174	175
PERCENT MAX. CORRECTED POWER	5.1	7.6	10.2	30.0	59.8	89.5	100.4
CORRECTED SHAFT HP	36.1	53.9	71.9	211.5	492.9	632.2	709.1
MEASURED SHAFT HP	35.8	53.4	71.3	210.1	489.2	626.9	703.8
SHAFT SPEED, N1, RPM	27530.0	27510.0	27540.0	41750.0	41730.0	41720.0	41700.0
COMPRESSOR INLET TEMP.,DEG.F	89.0	90.0	90.0	92.0	91.0	90.0	91.0
COMPRESSOR DSCHG. PRES.,PSIA	46.6	46.8	47.1	120.6	135.6	139.6	141.2
COMPRESSOR DSCHG. TEMP,DEG F	335.0	340.0	344.0	662.0	675.0	681.0	685.0
TURB INTERSTAGE TEMP., DEG.F	939.0	1018.0	1096.0	1139.0	1385.0	1507.0	1574.0
CORR BELLMTH FLOW, LB/SEC	2.86	2.79	2.74	7.62	7.54	7.54	7.49
FA RATIO BASED ON BELLMTH.	.0112	.0126	.0148	.0099	.0139	.0162	.0173
MEASURED FUEL FLOW, LB/HR	108.0	118.0	129.0	254.0	352.0	410.0	436.0
FA RATIO CALC. FROM EMISSION	.0104	.0116	.0138	.0099	.0139	.0161	.0174
EQUIVALENCE RATIO	.153	.170	.191	.145	.203	.236	.255
LOADING W/P**N/V/E(T/540)	.314	.300	.290	.077	.068	.064	.062
COMB EFFIC FROM EMISSIONS	99.353	99.529	99.636	99.847	99.953	99.967	99.976

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.17	2.41	2.72	2.96	2.92	3.39	3.67
LB. CO2 PER LB. OF FUEL	3.12	3.13	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	336.8	369.8	404.1	798.8	1109.2	1292.3	1374.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	194.7	174.2	160.6	54.8	25.5	21.1	15.8
LB. PER 1000 LB. OF FUEL	17.851	14.374	11.778	5.319	1.754	1.247	.866
WEIGHT FLOW, LB./HR.	1.928	1.696	1.519	1.351	.617	.511	.377
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	49.5	32.4	23.7	5.7	1.8	1.2	1.2
LB. PER 1000 LB. OF FUEL	2.594	1.529	.993	.316	.071	.041	.038
WEIGHT FLOW, LB./HR.	.280	.180	.128	.080	.025	.017	.016
RATIO LB HC/LB CO	.1453	.1063	.0843	.0595	.0403	.0326	.0434
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	17.9	23.8	27.5	46.5	68.3	105.8	116.2
LB. PER 1000 LB. OF FUEL	2.696	3.116	3.312	7.419	9.970	10.211	10.449
WEIGHT FLOW, LB./HR.	.291	.368	.427	1.884	3.509	4.186	4.556
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.1	5.8	4.7	12.7	4.9	5.8	6.8
LB. PER 1000 LB. OF FUEL	.768	.678	.566	2.026	.553	.486	.539
WEIGHT FLOW, LB./HR.	.083	.080	.073	.515	.195	.199	.235
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.0	29.8	32.2	59.2	93.2	110.8	122.2
LB. PER 1000 LB. OF FUEL	3.464	3.796	3.878	9.445	10.523	10.697	10.989
WEIGHT FLOW, LB./HR.	.374	.448	.500	2.399	3.704	4.386	4.791
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00717	.00717	.00720	.00721	.00722	.00722	.00720
SMOKE NUMBER	1.10	2.30	1.10	4.60	3.40	5.70	4.50
CORRECTED WEIGHT FLOW	.02152	.02152	.02160	.02162	.02166	.02166	.02161
SMOKE NUMBER	4.60	4.60	4.60	10.30	13.80	11.50	10.30
CORRECTED WEIGHT FLOW	.03547	.03547	.03600	.03611	.03617	.03617	.03602
SMOKE NUMBER	5.70	4.60	3.40	14.90	19.50	16.10	14.90
CORRECTED WEIGHT FLOW	.05022	.05031	.05040	.05055	.05063	.05054	.05043
SMOKE NUMBER	8.00	8.00	5.70	18.40	21.80	21.80	20.70
SMOKE NUMBER AT WA=8.823	4.90	4.90	3.70	12.80	14.60	13.60	12.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.011).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG VJ8 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P84881 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 9
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	1.683	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	14.748	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.332	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	19.7	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 9.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 9 DATE: 10-29-75 TIME: BARO PRESS.: 28.828 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 32.00 PERCENT SPECIFIC HUMIDITY: .010888 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	176	177	178	179	180	181	182
ACTUAL POWER SETTING, HORSEPOWER	36.8	51.8	71.4	286.1	485.8	629.1	700.8
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.13	7.40	10.28	29.45	69.33	89.74	99.99
N1 SPEED, RPM	27550.00	27550.00	27560.00	41760.00	41720.00	41730.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	108.0	119.0	130.0	256.0	392.0	485.0	536.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.8	2.8	2.8	7.6	7.6	7.5	7.5
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	93.00	90.00	89.00	90.00	91.00	91.00	90.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.16	14.16	14.16	14.16	14.16	14.16	14.16
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.87	46.81	47.38	128.68	135.95	139.49	141.68
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	345.00	341.00	343.00	668.00	675.00	683.00	685.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	954.0	1005.0	1007.0	1144.0	1302.0	1508.0	1569.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.11	14.13	14.14	14.05	14.05	14.09	14.10
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	48.500	33.600	24.900	5.700	1.600	1.200	1.500
CARBON MONOXIDE (CO), PPMV	187.620	184.159	166.479	56.858	25.919	23.890	19.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	24.500	27.000	32.000	61.000	93.000	112.500	122.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.184	2.381	2.671	2.851	2.898	3.389	3.689
NITRIC OXIDE (NO), PPMV	19.000	21.700	27.500	48.500	67.500	106.750	117.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.185	1.684	1.862	.318	.871	.841	.848
CARBON MONOXIDE (CO)	17.881	15.384	12.422	3.946	1.799	1.614	.888
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.660	3.709	3.922	9.983	10.682	10.939	11.188
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.227	.191	.138	.081	.825	.816	.821
CARBON MONOXIDE (CO)	1.849	1.831	1.615	1.428	.633	.573	.384
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.395	.441	.518	2.535	3.732	4.438	4.878
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.41	99.58	99.61	99.84	99.95	99.96	99.98
F/A (EMISSIONS,CALC)	.0185	.0114	.0120	.0098	.0137	.0161	.0171

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 9
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	107.286	107.286	261.069	486.568	435.949	
FUEL MASS, LB	12.517	33.974	19.580	16.940	3.633	86.644
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	2.135	2.135	.341	.048	.047	1.234
RATE, LB HC/HR	.229	.229	.089	.020	.021	.192
MASS, LB HC	.027	.073	.007	.001	.000	.107
MASS, PERCENT OF TOTAL CYCLE	25.0	67.8	6.3	.8	.2	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						1.683
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	17.144	17.144	5.706	1.483	.873	10.815
RATE, LB CO/HR	1.839	1.839	1.498	.603	.380	1.678
MASS, LB CO	.215	.582	.112	.025	.003	.937
MASS, PERCENT OF TOTAL CYCLE	22.9	62.2	11.9	2.7	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						14.748
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.658	3.658	10.042	10.958	11.187	6.844
RATE, LB NOX/HR	.392	.392	2.622	4.455	4.877	1.062
MASS, LB NOX	.046	.124	.197	.186	.041	.593
MASS, PERCENT OF TOTAL CYCLE	7.7	21.0	33.2	31.3	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.332

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	17.1	33.6
HC (IDLE)	2.1	6.5
NOX (TAKEOFF)	11.2	22.4

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04881 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 9
RAT SHP= 706. RA EGT,F= 1658. RAT SPD= 41730. DEN PT,F= 57. REL HUM= 32.00 SPEC HUM= .018088
FUEL H/C= 1.9200 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.0 FLO,L/H= 14.168 SL TIM,S= 6.5888

DATA POINT NUMBER	176	177	178	179	180	181	182
PERCENT MAX. CORRECTED POWER	5.1	7.4	10.2	29.4	69.3	89.8	100.0
CORRECTED SHAFT HP	36.2	52.3	72.0	207.9	489.5	633.8	705.9
MEASURED SHAFT HP	36.0	51.8	71.4	206.1	485.8	629.1	700.0
SHAFT SPEED, N1, RPM	27550.0	27550.0	27560.0	41760.0	41720.0	41730.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	93.0	93.0	89.0	90.0	91.0	91.0	90.0
COMPRESSOR DSCHG. PRES.,PSIA	46.1	46.6	47.3	126.7	136.0	139.5	141.6
COMPRESSOR DSCHG. TEMP,DEG F	345.0	341.0	343.0	668.0	675.0	683.0	685.0
TURB INTERSTAGE TEMP., DEG.F	954.0	1005.0	1087.0	1144.0	1382.0	1508.0	1569.0
CORR BELLMTH FLOW, LB/SEC	2.04	2.79	2.76	7.63	7.56	7.54	7.52
FA RATIO BASED ON BELLMTH.	.0113	.0127	.0148	.0180	.0138	.0160	.0172
MEASURED FUEL FLOW, LB/HR	108.0	119.0	130.0	256.0	352.0	405.0	436.0
FA RATIO CALC. FROM EMISSION	.0105	.0114	.0125	.0098	.0137	.0161	.0171
EQUIVALENCE RATIO	.154	.168	.188	.144	.201	.236	.251
LOADING W/P**N/V/E(T/540)	.311	.300	.291	.076	.068	.064	.062
COMB EFFIC FROM EMISSIONS	99.414	99.497	99.615	99.842	99.951	99.963	99.975

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.16	2.36	2.67	2.05	2.89	3.39	3.61
LB. CO2 PER LB. OF FUEL	3.12	3.13	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	337.1	371.9	407.1	805.0	1109.2	1276.5	1374.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	187.8	184.2	166.5	56.8	25.9	23.9	15.8
LB. PER 1000 LB. OF FUEL	17.881	15.384	12.422	5.546	1.799	1.414	.888
WEIGHT FLOW, LB./HR.	1.845	1.831	1.615	1.420	.633	.573	.384
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	48.5	33.6	24.9	5.7	1.8	1.2	1.5
LB. PER 1000 LB. OF FUEL	2.185	1.684	1.062	.318	.071	.041	.048
WEIGHT FLOW, LB./HR.	.227	.191	.138	.081	.025	.016	.021
RATIO LB HC/LB CO	.1233	.1043	.0855	.0573	.0397	.0287	.0542
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	19.0	21.7	27.5	48.5	87.5	106.7	117.5
LB. PER 1000 LB. OF FUEL	2.836	2.978	3.371	7.772	9.975	10.388	10.731
WEIGHT FLOW, LB./HR.	.307	.354	.438	1.990	3.511	4.204	4.679
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.5	5.3	4.5	13.3	5.5	5.8	5.8
LB. PER 1000 LB. OF FUEL	.822	.727	.552	2.131	.627	.559	.457
WEIGHT FLOW, LB./HR.	.089	.087	.072	.546	.221	.226	.199
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	24.5	27.0	32.0	61.8	93.0	112.5	122.5
LB. PER 1000 LB. OF FUEL	3.660	3.705	3.922	9.903	10.602	10.939	11.188
WEIGHT FLOW, LB./HR.	.395	.441	.510	2.535	3.732	4.430	4.878
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.08702	.03697	.08694	.08692	.08693	.08694	.08694
SMOKE NUMBER	1.10	1.10	3.40	2.30	2.30	5.70	6.90
CORRECTED WEIGHT FLOW	.02106	.02090	.02082	.02077	.02080	.02083	.02083
SMOKE NUMBER	3.40	5.70	5.70	11.50	11.50	11.50	11.50
CORRECTED WEIGHT FLOW	.03518	.03483	.03478	.03461	.03467	.03472	.03472
SMOKE NUMBER	6.30	6.90	3.40	16.10	28.70	19.50	18.40
CORRECTED WEIGHT FLOW	.04905	.04868	.04858	.04845	.04852	.04868	.04868
SMOKE NUMBER	9.20	9.20	4.60	18.40	26.40	21.60	24.10
SMOKE NUMBER AT WA=0.023	9.30	5.90	4.30	12.40	15.70	14.90	15.90

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF HC, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: J
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 9
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.248	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	15.624	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.366	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.1	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 9 DATE: 10-29-75 TIME: BARO PRESS.: 28.848 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 32.00 PERCENT SPECIFIC HUMIDITY: .010000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	183	184	185	186	187	188	189
ACTUAL POWER SETTING, HORSEPOWER	34.7	52.9	72.6	289.1	488.7	628.8	701.2
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.95	7.54	10.37	29.82	69.78	89.68	100.08
N1 SPEED, RPM	27540.00	27560.00	27540.00	41740.00	41730.00	41730.00	41710.00
FUEL FLOW (MEAS.) LB./HR.	100.0	122.0	135.0	259.0	354.0	410.0	436.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.8	2.7	7.6	7.5	7.5	7.5
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	90.00	90.00	90.00	91.00	91.00	91.00	91.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.51	46.91	47.30	129.03	135.90	139.34	141.06
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	339.00	341.00	342.00	664.00	677.00	683.00	686.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	938.0	1013.0	1109.0	1141.0	1386.0	1509.0	1577.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.14	14.14	14.06	14.06	14.10	14.11
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	59.500	36.000	25.500	6.300	1.800	1.500	1.200
CARBON MONOXIDE (CO), PPMV	198.878	185.531	165.129	61.036	28.360	19.846	17.428
TOTAL OXIDES OF NITROGEN (NOX), PPMV	24.500	29.000	33.000	61.700	93.500	113.250	123.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.165	2.427	2.752	2.884	2.873	3.389	3.628
NITRIC OXIDE (NO), PPMV	18.200	23.000	29.000	48.000	86.500	107.500	117.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	2.987	1.687	1.056	.346	.072	.051	.038
CARBON MONOXIDE (CO)	18.224	15.289	11.962	5.859	1.980	1.175	.964
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.668	3.905	4.022	9.729	10.728	11.813	11.196
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.314	.206	.143	.090	.025	.021	.017
CARBON MONOXIDE (CO)	1.968	1.855	1.615	1.516	.701	.482	.420
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.398	.476	.543	2.520	3.795	4.515	4.882
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.32	99.49	99.63	99.83	99.95	99.97	99.97
F/A (EMISSIONS,CALC)	.0104	.0117	.0132	.0108	.0137	.0161	.0172

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 9
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	108.325	108.325	260.471	411.933	435.997	
FUEL MASS, LB	12.636	34.383	19.535	17.164	3.633	87.273
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	2.672	2.672	.339	.043	.038	1.631
RATE, LB HC/HR	.311	.311	.088	.018	.017	.255
MASS, LB HC	.036	.099	.007	.001	.000	.142
MASS, PERCENT OF TOTAL CYCLE	25.5	69.2	4.7	.5	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.248
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	18.164	18.164	5.898	1.246	.963	11.375
RATE, LB CO/HR	1.968	1.968	1.536	.513	.420	1.778
MASS, LB CO	.230	.623	.115	.021	.004	.993
MASS, PERCENT OF TOTAL CYCLE	23.1	62.8	11.6	2.2	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						15.624
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.696	3.696	9.788	11.852	11.196	6.819
RATE, LB NOX/HR	.400	.400	2.550	4.553	4.882	1.066
MASS, LB NOX	.047	.127	.191	.198	.041	.595
MASS, PERCENT OF TOTAL CYCLE	7.8	21.3	32.1	31.9	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.366

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE		REQUIRED EMISSION INDEX, LBP/1000 LB FUEL		
POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE	POLLUTANT (MODE)	A	B
CO	26.8	CO (IDLE)	18.2	33.3
HC	4.9	HC (IDLE)	2.9	6.5
NOX	12.9	NOX (TAKEOFF)	11.2	22.1

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P94001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 9
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 57. REL HUM= 32.00 SPEC HUM= .010808
FUEL H/C= 1.9260 STOI F/A= .06822 L H V= 18478. S .H T,F= 300.0 FLO.L/M= 14.160 SL TIM.S= 6.5808

DATA POINT NUMBER	183	184	185	186	187	188	189
PERCENT MAX. CORRECTED POWER	4.9	7.5	10.4	29.8	69.7	89.7	100.0
CORRECTED SHAFT HP	34.9	53.3	73.2	210.5	492.1	633.1	706.0
MEASURED SHAFT HP	34.7	52.9	72.6	209.1	488.7	628.8	701.2
SHAFT SPEED, N1, RPM	27540.0	27560.0	27540.0	41748.0	41738.0	41738.0	41710.0
COMPRESSOR INLET TEMP.,DEG.F	98.0	98.0	98.0	91.0	91.0	91.0	91.0
COMPRESSOR DSCHG. PRES.,PSIA	46.5	46.9	47.3	129.0	135.9	139.3	141.1
COMPRESSOR DSCHG. TEMP,DEG F	339.0	341.0	342.0	664.0	677.0	683.0	686.0
TURB INTERSTAGE TEMP., DEG.F	938.0	1013.0	1109.0	1141.0	1366.0	1509.0	1577.0
CORR BELMTH FLOW, LB/SEC	2.85	2.82	2.74	7.64	7.55	7.52	7.49
FA RATIO BASED ON BELLMTH.	.0112	.0123	.0146	.0181	.0139	.0162	.0173
MEASURED FUEL FLOW, LB/HR	108.0	122.8	135.8	259.0	354.0	410.8	436.8
FA RATIO CALC. FROM EMISSION	.0104	.0117	.0132	.0188	.0137	.0161	.0172
EQUIVALENCE RATIO	.153	.171	.193	.146	.200	.236	.252
LOADING W/P**N/V/E(T/540)	.312	.302	.289	.077	.067	.064	.062
COMB EFFIC FROM EMISSIONS	99.316	99.494	99.626	99.832	99.947	99.966	99.974

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.17	2.43	2.75	2.88	2.87	3.39	3.63
LB. CO2 PER LB. OF FUEL	3.12	3.13	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	336.7	381.3	422.9	814.3	1115.4	1292.4	1374.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	198.9	185.5	165.1	61.8	26.4	19.8	17.4
LB. PER 1000 LB. OF FUEL	18.224	15.203	11.962	5.859	1.988	1.175	.964
WEIGHT FLOW, LB./HR.	1.968	1.855	1.615	1.518	.701	.482	.420
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	55.5	36.0	25.5	6.3	1.8	1.5	1.2
LB. PER 1000 LB. OF FUEL	2.987	1.687	1.056	.346	.072	.051	.038
WEIGHT FLOW, LB./HR.	.314	.206	.143	.098	.025	.021	.017
RATIO LB HC/LB CO	.1595	.1189	.0883	.0598	.0363	.0432	.0394
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	18.2	23.0	29.8	48.0	86.5	107.5	117.5
LB. PER 1000 LB. OF FUEL	2.739	3.097	3.451	7.569	9.918	10.454	10.674
WEIGHT FLOW, LB./HR.	.296	.378	.466	1.960	3.511	4.286	4.654
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.3	6.8	4.8	13.7	7.8	5.7	5.7
LB. PER 1000 LB. OF FUEL	.948	.888	.571	2.168	.883	.559	.522
WEIGHT FLOW, LB./HR.	.102	.099	.077	.568	.284	.229	.228
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	24.5	29.8	33.8	61.7	93.5	113.2	123.2
LB. PER 1000 LB. OF FUEL	3.688	3.985	4.022	9.729	10.728	11.013	11.196
WEIGHT FLOW, LB./HR.	.398	.476	.543	2.528	3.795	4.515	4.882
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00708	.00707	.00707	.00709	.00709	.00710	.00710
SMOKE NUMBER	4.60	2.30	3.40	5.70	8.00	6.90	4.60
CORRECTED WEIGHT FLOW	.02125	.02121	.02121	.02128	.02128	.02131	.02131
SMOKE NUMBER	6.90	4.60	4.60	11.50	13.80	12.60	11.50
CORRECTED WEIGHT FLOW	.03541	.03535	.03535	.03547	.03553	.03552	.03551
SMOKE NUMBER	8.00	8.00	8.00	16.10	20.70	17.20	16.40
CORRECTED WEIGHT FLOW	.04957	.04949	.04958	.04957	.04974	.04973	.04971
SMOKE NUMBER	9.20	9.20	8.00	28.70	25.30	21.80	21.80
SMOKE NUMBER AT WA=8.823	7.20	6.10	6.10	13.60	17.10	14.70	14.20

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.8 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 18
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.487	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.949	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.195	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	18.2	SMOKE NUMBER, MAXIMUM AT CRUISE MODE. 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 18 DATE: 10-29-75 TIME: BARO PRESS.: 28.048 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT SPECIFIC HUMIDITY: .015000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	190	191	192	193	194	195	196
ACTUAL POWER SETTING, HORSEPOWER	34.6	51.5	73.5	209.4	491.7	631.2	708.6
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.98	7.35	10.49	29.89	70.12	89.93	99.92
N1 SPEED, RPM	27550.00	27550.00	27480.00	41750.00	41730.00	41700.00	41720.00
FUEL FLOW (MEAS.) LB./HR.	110.0	123.0	135.0	262.0	364.0	417.0	446.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.7	7.6	7.6	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	89.00	90.00	90.00	90.00	90.00	92.00	91.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.30	47.74	48.84	129.96	137.67	140.72	142.83
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	324.00	326.00	327.00	641.00	654.00	668.00	674.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	924.0	994.0	1084.0	1132.0	1373.0	1495.0	1556.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.12	14.14	14.15	14.05	14.06	14.10	14.11
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	58.500	40.500	33.000	6.600	2.400	1.200	1.500
CARBON MONOXIDE (CO), PPMV	213.340	197.027	176.420	64.814	27.953	22.270	15.621
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.000	25.300	30.300	53.000	80.700	97.500	108.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.165	2.411	2.741	2.132	2.912	3.407	3.609
NITRIC OXIDE (NO), PPMV	18.000	20.000	25.000	40.000	75.500	93.750	103.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.862	1.988	1.371	.354	.894	.848	.848
CARBON MONOXIDE (CO)	19.534	16.241	12.622	6.883	1.925	1.311	.868
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.389	3.426	3.617	8.171	9.128	9.438	9.932
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.337	.235	.185	.893	.834	.817	.821
CARBON MONOXIDE (CO)	2.149	1.998	1.731	1.594	.701	.547	.392
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.364	.421	.488	2.141	3.323	3.932	4.438
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.27	99.45	99.58	99.83	99.95	99.97	99.98
F/A (EMISSIONS,CALC)	.0185	.0116	.0131	.0102	.0139	.0162	.0171

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-29-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 18
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.000	635.400	786.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	118.157	118.157	263.115	417.527	445.413	
FUEL MASS, LB	12.852	34.883	19.734	17.397	3.712	88.577
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.845	3.845	.342	.836	.858	1.727
RATE, LB HC/HR	.335	.335	.090	.015	.026	.274
MASS, LB HC	.039	.106	.007	.001	.000	.153
MASS, PERCENT OF TOTAL CYCLE	25.6	69.4	4.4	.4	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.407
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.496	19.496	6.889	1.321	.844	12.158
RATE, LB CO/HR	2.148	2.148	1.602	.552	.376	1.929
MASS, LB CO	.251	.688	.128	.023	.003	1.077
MASS, PERCENT OF TOTAL CYCLE	23.3	63.2	11.2	2.1	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.949
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.311	3.311	8.193	9.434	9.934	9.878
RATE, LB NOX/HR	.365	.365	2.156	3.939	4.425	.933
MASS, LB NOX	.043	.115	.162	.164	.037	.521
MASS, PERCENT OF TOTAL CYCLE	8.2	22.2	31.8	31.5	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.195

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.5	32.6
HC (IDLE)	3.8	6.4
NOX (TAKEOFF)	9.9	24.7

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869882-4 FUEL= AV. KERO. TEST NO.= 18

RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 68. REL HUM= 48.00 SPEC HUM= .015000

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 380.0 FLO,L/HR= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	190	191	192	193	194	195	196
PERCENT MAX. CORRECTED POWER	5.0	7.4	10.5	29.9	70.1	89.9	99.9
CORRECTED SHAFT HP	35.1	51.9	74.0	211.0	495.1	634.9	705.4
MEASURED SHAFT HP	34.8	51.5	73.5	209.4	491.3	631.2	700.6
SHAFT SPEED, N1, RPM	27550.0	27550.0	27480.0	41750.0	41730.0	41700.0	41720.0
COMPRESSOR INLET TEMP.,DEG.F	89.0	90.0	90.0	90.0	90.0	92.0	91.0
COMPRESSOR DSCHG. PRES.,PSIA	47.3	47.7	48.0	130.0	137.7	140.7	142.6
COMPRESSOR DSCHG. TEMP,DEG F	324.0	326.0	327.0	641.0	654.0	668.0	674.0
TURB INTERSTAGE TEMP., DEG.F	924.0	994.0	1064.0	1132.0	1373.0	1495.0	1556.0
CORR BELMTH FLOW, LB/SEC	2.91	2.86	2.79	7.65	7.64	7.68	7.61
FA RATIO BASED ON BELLMTH.	.0112	.0128	.0144	.0102	.0141	.0163	.0174
MEASURED FUEL FLOW, LB/HR	110.0	123.0	135.0	262.0	364.0	417.0	446.0
FA RATIO CALC. FROM EMISSION	.0105	.0116	.0131	.0102	.0139	.0162	.0171
EQUIVALENCE RATIO	.153	.170	.193	.150	.203	.237	.251
LOADING W/P**N/V/E(T/540)	.317	.386	.294	.079	.078	.065	.063
COMB EFFIC FROM EMISSIONS	99.272	99.451	99.578	99.826	99.946	99.966	99.975

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.17	2.41	2.74	2.13	2.91	3.41	3.61
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	342.6	384.2	422.6	823.6	1146.9	1314.3	1406.8
CARBON MONOXIDE							
PPM BY VOLUME, WET	213.3	197.0	176.4	64.8	28.0	22.3	15.8
LB. PER 1000 LB. OF FUEL	19.534	16.241	12.822	6.083	1.925	1.311	.888
WEIGHT FLOW, LB./HR.	2.149	1.998	1.731	1.594	.701	.547	.392
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	58.5	40.5	33.0	6.6	2.4	1.2	1.5
LB. PER 1000 LB. OF FUEL	3.862	1.908	1.371	.354	.094	.040	.048
WEIGHT FLOW, LB./HR.	.337	.235	.185	.093	.034	.017	.021
RATIO LB HC/LB CO	.1567	.1175	.1069	.0582	.0491	.0308	.0542
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	18.0	20.0	25.0	40.0	75.5	93.8	103.7
LB. PER 1000 LB. OF FUEL	2.707	2.708	2.985	6.167	8.540	9.867	9.476
WEIGHT FLOW, LB./HR.	.298	.333	.403	1.616	3.109	3.781	4.226
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.8	5.3	5.3	13.8	5.2	3.8	5.8
LB. PER 1000 LB. OF FUEL	.682	.718	.633	2.084	.588	.363	.457
WEIGHT FLOW, LB./HR.	.066	.088	.085	.525	.214	.151	.284
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.8	25.3	30.3	53.8	80.7	97.5	108.7
LB. PER 1000 LB. OF FUEL	3.389	3.426	3.617	8.171	9.128	9.438	9.932
WEIGHT FLOW, LB./HR.	.364	.421	.488	2.141	3.323	3.932	4.438
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.08708	.08708	.07868	.08708	.08708	.08708	.08709
SMOKE NUMBER	3.50	2.30	3.50	7.00	7.00	7.00	5.00
CORRECTED WEIGHT FLOW	.02125	.02125	.02125	.02124	.02124	.02124	.02128
SMOKE NUMBER	4.70	2.30	3.50	10.50	16.30	11.60	14.00
CORRECTED WEIGHT FLOW	.03548	.03542	.03542	.03541	.03548	.03546	.03553
SMOKE NUMBER	3.50	4.70	5.80	17.40	22.10	18.60	19.80
CORRECTED WEIGHT FLOW	.04967	.04959	.04959	.04957	.04956	.04965	.04974
SMOKE NUMBER	7.00	5.80	5.80	22.10	26.70	23.30	24.40
SMOKE NUMBER AT WA=0.023	4.70	3.80	4.70	14.40	18.20	15.20	16.10

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 18
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.564	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.625	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.055	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	19.1	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869882-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 18 DATE: 10-30-75 TIME: BARO PRESS.: 28.760 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT SPECIFIC HUMIDITY: .015000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	197	198	199	200	201	202	203
ACTUAL POWER SETTING, HORSEPOWER	35.0	52.4	70.4	209.9	484.8	631.3	699.1
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.01	7.48	10.09	30.13	69.33	90.19	99.89
N1 SPEED, RPM	27540.00	27510.00	27570.00	41760.00	41740.00	41740.00	41750.00
FUEL FLOW (MEAS.) LB./HR.	110.0	122.0	135.0	263.0	358.0	415.0	446.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.7	7.7	7.6	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	98.00	93.00	86.00	87.00	91.00	92.00	92.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.13	14.13	14.13	14.13	14.13	14.13	14.13
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.35	47.79	48.13	130.26	136.39	140.86	142.19
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	323.00	327.00	327.00	640.00	655.00	669.00	673.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	922.0	1088.0	1067.0	1130.0	1366.0	1508.0	1558.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.10	14.10	14.10	14.01	14.03	14.07	14.08
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	68.300	40.500	35.700	9.800	5.100	1.500	.900
CARBON MONOXIDE (CO), PPMV	208.652	191.498	175.513	62.714	25.919	17.831	19.442
TOTAL OXIDES OF NITROGEN (NOX), PPMV	28.000	24.600	28.500	53.200	78.750	98.000	107.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.156	2.411	2.645	2.084	2.862	3.321	3.602
NITRIC OXIDE (NO), PPMV	14.600	19.000	23.000	48.500	71.750	92.750	100.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.170	1.909	1.537	.494	.284	.852	.829
CARBON MONOXIDE (CO)	19.191	15.789	13.217	6.019	1.816	1.077	1.883
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.022	3.332	3.525	8.387	9.864	9.724	9.812
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.349	.233	.207	.138	.873	.821	.813
CARBON MONOXIDE (CO)	2.111	1.926	1.784	1.583	.658	.447	.483
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.332	.406	.476	2.206	3.245	4.035	4.376
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.27	99.46	99.55	99.82	99.94	99.97	99.97
F/A (EMISSIONS,CALC)	.0104	.0116	.0127	.0100	.0136	.0158	.0171

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 10
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	109.962	109.962	262.113	414.053	445.946	
FUEL MASS, LB	12.829	34.821	19.658	17.252	3.716	88.277
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.176	3.176	.515	.072	.052	1.846
RATE, LB HC/HR	.349	.349	.135	.030	.023	.292
MASS, LB HC	.041	.111	.018	.001	.000	.163
MASS, PERCENT OF TOTAL CYCLE	25.0	67.9	6.2	.8	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.564
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.204	19.204	6.839	1.076	1.061	11.966
RATE, LB CO/HR	2.112	2.112	1.583	.446	.482	1.892
MASS, LB CO	.246	.669	.119	.019	.004	1.056
MASS, PERCENT OF TOTAL CYCLE	23.3	63.3	11.2	1.8	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.625
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.020	3.020	8.351	9.700	9.708	5.798
RATE, LB NOX/HR	.332	.332	2.189	4.016	4.365	.917
MASS, LB NOX	.039	.105	.164	.167	.036	.512
MASS, PERCENT OF TOTAL CYCLE	7.6	20.5	32.1	32.7	7.1	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.055

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.2	32.8
HC (IDLE)	3.2	6.3
NOX (TAKEOFF)	9.8	24.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 10
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. OEM PT,F= 68. REL HUM= 48.00 SPEC HUM= .015000
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	197	198	199	200	201	202	203
PERCENT MAX. CORRECTED POWER	5.0	7.5	10.1	30.1	69.3	90.2	99.9
CORRECTED SHAFT HP	35.4	52.8	71.3	212.7	489.5	636.8	705.2
MEASURED SHAFT HP	35.0	52.4	70.4	209.9	484.8	631.3	699.1
SHAFT SPEED, N1, RPM	27540.0	27510.0	27570.0	41760.0	41740.0	41740.0	41750.0
COMPRESSOR INLET TEMP.,DEG.F	90.0	93.0	88.0	87.0	91.0	92.0	92.0
COMPRESSOR DSCHG. PRES.,PSIA	47.3	47.8	48.1	130.3	136.4	140.9	142.2
COMPRESSOR DSCHG. TEMP,DEG F	323.0	327.0	327.0	640.0	655.0	669.0	673.0
TURB INTERSTAGE TEMP., DEG.F	922.0	1000.0	1067.0	1130.0	1366.0	1500.0	1558.0
CORR BELLMTH FLOW, LB/SEC	2.92	2.87	2.80	7.73	7.70	7.61	7.63
FA RATIO BASED ON BELLMTH.	.0112	.0127	.0143	.0101	.0138	.0162	.0174
MEASURED FUEL FLOW, LB/HR	110.0	122.0	135.0	263.0	358.0	415.0	446.0
FA RATIO CALC. FROM EMISSION	.0104	.0116	.0127	.0100	.0136	.0156	.0171
EQUIVALENCE RATIO	.153	.170	.186	.146	.200	.231	.250
LOADING W/P**N/V/E(T/540)	.317	.304	.294	.080	.071	.065	.063
COMB EFFIC FROM EMISSIONS	99.270	99.461	99.554	99.815	99.939	99.978	99.972

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.16	2.41	2.64	2.88	2.86	3.32	3.60
LB. CO2 PER LB. OF FUEL	3.12	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	342.7	381.1	422.4	826.7	1127.9	1308.2	1405.9
CARBON MONOXIDE							
PPM BY VOLUME, WET	288.7	191.5	175.5	62.7	25.9	17.8	19.4
LB. PER 1000 LB. OF FUEL	19.191	15.789	13.217	6.019	1.816	1.077	1.083
WEIGHT FLOW, LB./HR.	2.111	1.926	1.784	1.583	.650	.447	.483
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	68.3	40.5	35.7	9.8	5.1	1.5	.9
LB. PER 1000 LB. OF FUEL	3.170	1.909	1.537	.494	.204	.052	.029
WEIGHT FLOW, LB./HR.	.349	.233	.207	.130	.073	.021	.013
RATIO LB HC/LB CO	.1652	.1209	.1163	.0820	.1125	.0481	.0265
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.6	19.0	23.8	40.5	71.7	92.7	100.2
LB. PER 1000 LB. OF FUEL	2.286	2.573	2.845	6.385	8.258	9.203	9.171
WEIGHT FLOW, LB./HR.	.243	.314	.384	1.679	2.956	3.819	4.098
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.4	5.6	5.5	12.7	7.0	5.3	7.0
LB. PER 1000 LB. OF FUEL	.816	.758	.680	2.002	.806	.521	.648
WEIGHT FLOW, LB./HR.	.090	.093	.092	.527	.288	.216	.286
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.0	24.6	29.5	53.2	78.7	98.0	107.2
LB. PER 1000 LB. OF FUEL	3.022	3.332	3.525	8.387	9.064	9.724	9.812
WEIGHT FLOW, LB./HR.	.332	.406	.476	2.206	3.245	4.035	4.376
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00714	.00711	.00709	.00707	.00704	.00702	.00700
SMOKE NUMBER	4.70	2.30	4.70	7.00	8.10	7.00	8.10
CORRECTED WEIGHT FLOW	.02142	.02134	.02126	.02120	.02111	.02105	.02101
SMOKE NUMBER	4.70	3.50	5.00	11.60	16.30	14.00	15.10
CORRECTED WEIGHT FLOW	.03570	.03549	.03543	.03533	.03519	.03509	.03502
SMOKE NUMBER	5.00	5.00	5.00	18.60	22.10	16.30	19.00
CORRECTED WEIGHT FLOW	.04989	.04969	.04960	.04947	.04926	.04912	.04903
SMOKE NUMBER	9.30	8.10	8.10	28.90	29.10	23.30	22.10
SMOKE NUMBER AT WA=8.823	6.10	5.00	6.10	14.70	19.10	15.30	16.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF HC, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAGC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 18
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.337	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	15.296	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	7.942	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.3	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.268 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 18 DATE: 10-30-75 TIME: BARO PRESS.: 28.778 IN. HGA
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 48.00 PERCENT SPECIFIC HUMIDITY: .015000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.58 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	204	205	206	207	208	209	210
ACTUAL POWER SETTING, HORSEPOWER	35.0	52.4	73.3	212.2	491.9	631.4	699.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.01	7.50	10.48	30.41	70.26	90.10	100.06
N1 SPEED, RPM	27560.00	27520.00	27530.00	41750.00	41700.00	41750.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	108.0	119.0	135.0	261.0	358.0	412.0	436.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.7	7.6	7.6	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	91.00	90.00	91.00	88.00	92.00	93.00	90.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.13	14.13	14.13	14.13	14.13	14.13	14.13
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.30	47.54	48.04	129.67	136.54	140.47	142.78
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	324.00	325.00	328.00	648.00	663.00	667.00	669.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	927.0	993.0	1085.0	1136.0	1377.0	1500.0	1553.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.09	14.10	14.10	14.02	14.04	14.07	14.08
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	57.600	49.000	33.000	5.700	1.500	.300	.300
CARBON MONOXIDE (CO), PPMV	197.489	182.334	163.332	53.928	19.846	16.223	11.617
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.700	25.000	28.000	54.100	77.750	97.500	105.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.151	2.391	2.671	2.103	2.862	3.389	3.673
NITRIC OXIDE (NO), PPMV	15.000	19.400	23.600	41.700	72.000	91.500	98.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.037	2.139	1.407	.318	.060	.010	.009
CARBON MONOXIDE (CO)	18.216	15.162	12.185	5.132	1.391	.961	.646
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.136	3.415	3.431	6.456	8.952	9.403	9.428
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.328	.255	.190	.881	.022	.004	.004
CARBON MONOXIDE (CO)	1.967	1.804	1.645	1.348	.498	.396	.281
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.339	.406	.463	2.207	3.205	3.987	4.108
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.31	99.46	99.59	99.85	99.96	99.98	99.98
F/A (EMISSIONS,CALC)	.0104	.0115	.0128	.0101	.0136	.0161	.0174

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 10
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.116	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	107.980	107.980	258.753	411.667	435.951	
FUEL MASS, LB	12.598	34.194	19.406	17.153	3.633	86.984
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.039	3.039	.312	.018	.009	1.787
RATE, LB HC/HR	.328	.328	.081	.004	.004	.266
MASS, LB HC	.038	.104	.006	.000	.000	.148
MASS, PERCENT OF TOTAL CYCLE	25.8	70.0	4.1	.1	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.337
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	18.222	18.222	5.175	.959	.652	11.173
RATE, LB CO/HR	1.968	1.968	1.339	.395	.284	1.741
MASS, LB CO	.230	.623	.108	.016	.002	.972
MASS, PERCENT OF TOTAL CYCLE	23.6	64.1	10.3	1.7	.2	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						15.296
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.135	3.135	8.359	9.466	9.442	5.801
RATE, LB NOX/HR	.339	.339	2.158	3.897	4.116	.904
MASS, LB NOX	.039	.107	.161	.162	.034	.505
MASS, PERCENT OF TOTAL CYCLE	7.8	21.2	32.0	32.2	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						7.942

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	18.2	33.8
HC (IDLE)	3.0	6.5
NOX (TAKEOFF)	9.4	24.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84881 COMB P/N= 869882-4 FUEL= AV. KERO. TEST NO.= 18
RAT SHP= 736. RA EGT,F= 1658. RAT SPD= 41730. DEW PT,F= 66. REL HUM= 48.00 SPEC HUM= .015000
FUEL H/C= 1.9280 STOI F/A= .06622 L H V= 18478. S LN T,F= 308.0 FLO.L/M= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	284	285	286	287	288	289	218
PERCENT MAX. CORRECTED POWER	5.0	7.5	10.5	30.4	70.3	98.1	100.1
CORRECTED SHAFT HP	35.3	53.8	74.8	214.7	496.8	636.1	706.4
MEASURED SHAFT HP	35.8	52.4	73.3	212.2	491.9	631.4	699.3
SHAFT SPEED, N1, RPM	27560.8	27520.8	27530.8	41750.8	41700.8	41750.8	41730.8
COMPRESSOR INLET TEMP.,DEG.F	91.8	90.8	91.8	88.8	92.8	93.8	90.8
COMPRESSOR DSCHG. PRES.,PSIA	47.3	47.5	48.8	129.7	136.5	140.5	142.8
COMPRESSOR DSCHG. TEMP,DEG F	324.8	325.8	328.8	640.8	660.8	667.8	669.8
TURB INTERSTAGE TEMP., DEG.F	927.8	993.8	1065.8	1136.8	1377.8	1588.8	1553.8
CORR BELMTH FLOW, LB/SEC	2.91	2.87	2.82	7.73	7.64	7.62	7.64
FA RATIO BASED ON BELLMTH.	.0110	.0123	.0142	.0160	.0140	.0161	.0170
MEASURED FUEL FLOW, LB/HR	108.8	119.8	139.8	261.8	356.8	412.8	436.8
FA RATIO CALC. FROM EMISSION	.0104	.0115	.0128	.0101	.0136	.0161	.0174
EQUIVALENCE RATIO	.192	.169	.188	.147	.200	.236	.255
LOADING W/P**N/V/E(T/540)	.316	.389	.296	.868	.878	.865	.864
COMB EFFIC FROM EMISSIONS	99.395	99.456	99.598	99.852	99.962	99.977	99.984

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.19	2.39	2.67	2.18	2.86	3.39	3.67
LB. CO2 PER LB. OF FUEL	3.12	3.12	3.13	3.15	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	336.6	371.8	422.7	820.9	1120.3	1298.8	1374.7
CARBON MONOXIDE							
PPM BY VOLUME, WET	197.5	182.3	163.5	53.9	19.8	16.2	11.8
LB. PER 1000 LB. OF FUEL	18.216	15.162	12.165	5.132	1.391	.961	.646
WEIGHT FLOW, LB./HR.	1.967	1.884	1.645	1.340	.494	.396	.281
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	57.6	45.8	33.8	5.7	1.5	.3	.3
LB. PER 1000 LB. OF FUEL	3.037	2.139	1.487	.318	.068	.018	.009
WEIGHT FLOW, LB./HR.	.328	.255	.198	.081	.022	.004	.004
RATIO LB HC/LB CO	.1667	.1411	.1195	.0604	.0432	.0106	.0145
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	15.0	19.4	23.6	41.7	72.8	91.5	98.8
LB. PER 1000 LB. OF FUEL	2.273	2.658	2.892	6.519	8.298	8.899	8.862
WEIGHT FLOW, LB./HR.	.245	.315	.398	1.701	2.960	3.667	3.864
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.7	5.6	4.4	12.4	5.8	6.8	6.3
LB. PER 1000 LB. OF FUEL	.864	.769	.539	1.939	.662	.584	.561
WEIGHT FLOW, LB./HR.	.093	.091	.073	.506	.237	.240	.245
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.7	25.0	28.0	54.1	77.7	97.5	105.0
LB. PER 1000 LB. OF FUEL	3.136	3.419	3.431	8.458	8.952	9.483	9.423
WEIGHT FLOW, LB./HR.	.339	.406	.463	2.207	3.205	3.907	4.108
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.08708	.08702	.08707	.08710	.08707	.08698	.08694
SMOKE NUMBER	3.50	5.88	5.88	8.10	7.88	9.38	7.88
CORRECTED WEIGHT FLOW	.02124	.02105	.02128	.02154	.02121	.02094	.02082
SMOKE NUMBER	7.88	9.88	9.88	11.68	15.18	12.88	11.68
CORRECTED WEIGHT FLOW	.03548	.03508	.03547	.03598	.03528	.03498	.03471
SMOKE NUMBER	9.38	7.88	7.88	17.48	28.98	19.88	17.48
CORRECTED WEIGHT FLOW	.04956	.04911	.04984	.05827	.04948	.04886	.04862
SMOKE NUMBER	9.38	7.88	8.18	22.18	25.68	24.48	19.88
SMOKE NUMBER AT WA=0.823	7.38	6.48	6.78	14.88	17.38	16.68	14.28

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG # AIRESEARCH TEST FACIL # PHX LACC2 INSTR DESCRIP # F&D AEG V36 N136 CALC DATE #10-30-75
MODEL NO.# TPE331-3-251M S/N# P84881 ENGINE TYPE(CLASS)# TURBOPROP CALC ID# 1
RATED POWER# 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO# 11
FUEL# ASTM D1655-73 ATOMIC H/C RATIO# 1.928 LHV# 18470. BTU/LB ADDITIVES# NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CM AS CH4)	3.306	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.647	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	7.210	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.1	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING# 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE# REVERSE FLOW ANNULAR P/N# 869982-4 SUR/VOL# 1.260 FUEL INJ TYPE# STAGED SIMPLEX
ENGINE TOTAL SERVICE# 0.0 HR TIME SINCE ENGINE OVERHAUL# 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION#
AIRCRAFT INSTALLATION **** MFR.# MODEL NO.#
USER# ENGINE INSTALLATION POSITION#

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.# 11 DATE# 10-30-75 TIME# BARO PRESS.# 28.788 IN. HGA.
AMBIENT AIR TEMP.# 91.00 DEG. F RELATIVE HUMIDITY# 65.00 PERCENT SPECIFIC HUMIDITY# .020800 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC)# 0.0 PPMC CARBON MONOXIDE (CO)# 0.0 PPMV OXIDES OF NITROGEN (NOX)# 0.0 PPMV
SAMPLE LINE *** TEMP.# 300.00 DEG. F. FLOWRATE# 14.16 LITERS/MIN. TRANSPORT TIME# 6.50 SEC. LENGTH# 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	211	212	213	214	215	216	217
ACTUAL POWER SETTING, HORSEPOWER	34.8	58.5	78.4	210.1	489.8	629.1	698.2
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.99	7.22	10.11	30.20	70.20	90.07	100.05
N1 SPEED, RPM	27520.00	27550.00	27570.00	41750.00	41750.00	41730.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	113.8	124.0	133.8	266.0	362.0	416.0	443.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	7.8	7.7	7.7	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	90.00	93.00	88.00	88.00	89.00	92.00	91.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.10	14.10	14.10	14.10	14.10	14.10	14.10
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.04	48.23	49.82	130.75	138.75	141.80	143.57
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	310.00	313.00	310.00	618.00	622.00	629.00	630.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	918.0	982.0	1040.0	1116.0	1360.0	1510.0	1600.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.06	14.06	14.06	13.99	14.00	14.03	14.05
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	78.000	68.300	93.700	12.300	3.300	.600	.300
CARBON MONOXIDE (CO), PPMV	223.264	209.119	196.564	61.036	23.890	19.846	19.846
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.500	22.000	24.800	49.200	78.000	84.000	91.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.204	2.386	2.613	2.117	2.873	3.413	3.609
NITRIC OXIDE (NO), PPMV	13.000	16.400	28.100	36.400	63.000	79.750	87.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.086	2.867	2.336	.664	.132	.028	.010
CARBON MONOXIDE (CO)	28.063	17.396	14.959	5.766	1.666	1.166	1.103
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.798	3.096	3.100	7.635	8.027	8.118	8.338
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.453	.356	.311	.177	.048	.008	.004
CARBON MONOXIDE (CO)	2.267	2.157	1.989	1.534	.604	.485	.489
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.315	.373	.412	2.031	2.906	3.374	3.692
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.18	99.34	99.44	99.81	99.95	99.97	99.97
F/A (EMISSIONS,CALC)	.0107	.0115	.0126	.0181	.0137	.0162	.0171

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 11
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.580	2.500	.500	33.580
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.865	26.475	5.883	63.540
FUEL FLOW, LB/HR	113.057	113.057	263.882	415.421	443.477	
FUEL MASS, LB	13.190	35.801	19.791	17.309	3.696	89.787
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.999	3.999	.692	.025	.002	2.348
RATE, LB HC/HR	.452	.452	.183	.018	.001	.376
MASS, LB HC	.053	.143	.014	.000	.000	.210
MASS, PERCENT OF TOTAL CYCLE	-25.1	68.2	6.5	.2	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.306
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	20.049	20.049	5.802	1.162	1.111	12.488
RATE, LB CO/HR	2.267	2.267	1.531	.483	.493	2.888
MASS, LB CO	.264	.716	.115	.020	.004	1.121
MASS, PERCENT OF TOTAL CYCLE	23.6	64.0	10.2	1.8	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.647
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.791	2.791	7.593	8.105	8.338	5.182
RATE, LB NOX/HR	.316	.316	2.004	3.367	3.698	.821
MASS, LB NOX	.037	.100	.150	.140	.031	.458
MASS, PERCENT OF TOTAL CYCLE	8.0	21.8	32.8	30.6	6.7	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						7.218

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS PZ ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	28.8	31.9
HC (IDLE)	4.8	6.1
NOX (TAKEOFF)	8.3	26.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 11
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41738. DEW PT,F= 77. REL HUM= 65.88 SPEC HUM= .028808
FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	211	212	213	214	215	216	217
PERCENT MAX. CORRECTED POWER	5.0	7.2	10.1	30.2	70.2	98.1	100.1
CORRECTED SHAFT HP	35.2	51.0	71.4	213.2	495.6	635.9	706.4
MEASURED SHAFT HP	34.8	50.5	70.4	210.1	489.0	629.1	698.2
SHAFT SPEED, N1, RPM	27520.0	27550.0	27570.0	41750.0	41750.0	41738.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	90.0	93.0	88.0	88.0	89.0	92.0	91.0
COMPRESSOR DSCHG. PRES.,PSIA	48.0	48.2	49.0	130.7	136.6	141.8	143.6
COMPRESSOR DSCHG. TEMP,DEG F	310.0	313.0	310.0	618.0	622.0	629.0	630.0
TURB INTERSTAGE TEMP., DEG.F	910.0	982.0	1040.0	1110.0	1360.0	1510.0	1608.0
CORR BELLMTH FLOW, LB/SEC	2.96	2.92	2.92	7.78	7.74	7.78	7.78
FA RATIO BASED ON BELLMTH.	.0114	.0127	.0136	.0182	.0139	.0161	.0172
MEASURED FUEL FLOW, LB/HR	113.0	124.0	133.0	266.0	362.0	416.0	443.0
FA RATIO CALC. FROM EMISSION	.0107	.0115	.0126	.0181	.0137	.0162	.0171
EQUIVALENCE RATIO	.156	.169	.184	.149	.200	.237	.251
LOADING W/P**N/V/E(T/540)	.321	.312	.386	.083	.074	.069	.068
COMB EFFIC FROM EMISSIONS	99.177	99.339	99.443	99.886	99.949	99.971	99.973
**********SUMMARY OF REDUCED EMISSION DATA**********							
CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.28	2.39	2.61	2.12	2.87	3.41	3.61
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	351.6	386.7	415.5	836.1	1140.7	1311.3	1396.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	223.3	209.1	196.6	61.0	23.9	19.8	19.8
LB. PER 1000 LB. OF FUEL	20.063	17.396	14.959	5.766	1.668	1.166	1.103
WEIGHT FLOW, LB./HR.	2.267	2.157	1.989	1.534	.604	.485	.489
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	78.0	68.3	53.7	12.3	3.3	.6	.3
LB. PER 1000 LB. OF FUEL	4.896	2.867	2.336	.664	.132	.020	.018
WEIGHT FLOW, LB./HR.	.453	.356	.311	.177	.048	.008	.004
RATIO LB HC/LB CO	.1997	.1648	.1562	.1152	.0790	.0173	.0086
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.8	16.4	20.1	36.4	63.8	79.7	87.8
LB. PER 1000 LB. OF FUEL	1.919	2.241	2.513	5.649	7.224	7.700	7.945
WEIGHT FLOW, LB./HR.	.217	.278	.334	1.503	2.615	3.283	3.528
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.9	5.6	4.7	12.8	7.8	4.3	4.3
LB. PER 1000 LB. OF FUEL	.871	.765	.588	1.986	.803	.418	.388
WEIGHT FLOW, LB./HR.	.098	.095	.078	.528	.291	.171	.172
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	18.9	22.0	24.8	49.2	70.8	84.0	91.3
LB. PER 1000 LB. OF FUEL	2.790	3.006	3.100	7.635	8.027	8.118	8.333
WEIGHT FLOW, LB./HR.	.315	.373	.412	2.031	2.906	3.374	3.692
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00713	.00717	.00718	.00717	.00716	.00715	.00715
SMOKE NUMBER	0.00	0.00	0.00	4.80	6.00	6.00	4.80
CORRECTED WEIGHT FLOW	.02139	.02151	.02154	.02152	.02147	.02146	.02146
SMOKE NUMBER	2.40	1.20	1.20	18.70	15.50	11.30	11.90
CORRECTED WEIGHT FLOW	.03579	.03591	.03590	.03586	.03579	.03577	.03584
SMOKE NUMBER	3.60	2.40	1.20	15.50	20.20	16.70	16.70
CORRECTED WEIGHT FLOW	.05018	.05028	.05027	.05021	.05008	.05017	.05015
SMOKE NUMBER	4.80	4.80	3.60	21.40	22.60	21.40	22.60
SMOKE NUMBER AT WA=8.823	2.70	2.10	1.50	13.10	16.10	13.90	14.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-79
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: Z
RATED POWER: 796.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 11
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.920 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	2.887	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	17.253	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	7.077	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	14.7	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.8 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 11 DATE: 10-30-79 TIME: BARO PRESS.: 28.708 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 69.00 PERCENT SPECIFIC HUMIDITY: .020000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	218	219	220	221	222	223	224
ACTUAL POWER SETTING, HORSEPOWER	35.0	53.6	73.3	210.9	488.2	641.7	782.2
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.00	7.66	10.52	30.30	70.29	91.67	100.54
N1 SPEED, RPM	27550.00	27500.00	27520.00	41750.00	41718.00	41760.00	41748.00
FUEL FLOW (MEAS.) LB./HR.	112.0	125.0	136.0	263.0	362.0	421.0	446.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.9	7.7	7.7	7.7	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	95.00	98.00	89.00	88.00	86.00	92.00	92.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.18	14.18	14.18	14.18	14.18	14.18	14.18
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	47.50	46.84	46.82	138.60	136.75	142.29	143.91
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	313.00	312.00	311.00	616.00	620.00	629.00	631.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	907.0	968.0	1064.0	1121.0	1360.0	1488.0	1541.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.07	14.06	14.06	13.99	14.08	14.03	14.05
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	67.500	59.700	48.600	12.000	1.500	.600	.300
CARBON MONOXIDE (CO), PPMV	220.418	206.782	192.413	61.036	27.546	19.839	17.428
TOTAL OXIDES OF NITROGEN (NOX), PPMV	19.250	22.280	29.350	46.000	68.750	87.750	91.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.194	2.411	2.752	2.099	2.884	3.426	3.609
NITRIC OXIDE (NO), PPMV	14.809	16.400	20.900	34.800	62.750	80.750	87.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	3.464	2.810	2.089	.654	.060	.020	.010
CARBON MONOXIDE (CO)	19.905	17.025	13.914	5.816	1.919	1.115	.969
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.848	3.082	3.805	7.283	7.852	8.442	8.334
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.398	.351	.273	.172	.022	.008	.004
CARBON MONOXIDE (CO)	2.229	2.128	1.892	1.530	.693	.469	.432
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.319	.379	.489	1.894	2.843	3.554	3.717
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.23	99.35	99.50	99.81	99.95	99.97	99.98
F/A (EMISSIONS,CALC)	.0186	.0116	.0132	.0180	.0137	.0162	.0171

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-30-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 11
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	112.014	112.014	260.389	408.744	447.783	
FUEL MASS, LB	13.068	35.471	19.523	17.031	3.732	88.825
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	3.484	3.484	.630	.106	.068	2.865
RATE, LB HC/HR	.398	.398	.164	.043	.038	.329
MASS, LB HC	.046	.124	.012	.002	.000	.183
MASS, PERCENT OF TOTAL CYCLE	24.8	67.4	6.7	1.0	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						2.887
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.902	19.902	5.786	.762	1.155	12.342
RATE, LB CO/HR	2.229	2.229	1.506	.311	.517	1.963
MASS, LB CO	.260	.706	.113	.013	.004	1.096
MASS, PERCENT OF TOTAL CYCLE	23.7	64.4	10.3	1.2	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						17.253
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.848	2.848	7.129	8.268	8.421	5.862
RATE, LB NOX/HR	.319	.319	1.856	3.380	3.771	.885
MASS, LB NOX	.037	.101	.139	.141	.031	.450
MASS, PERCENT OF TOTAL CYCLE	8.3	22.5	31.0	31.3	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						7.077

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.9	32.4
HC (IDLE)	3.5	6.1
NOX (TAKEOFF)	8.4	26.5

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 11
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 77. RE. HUM= 65.00 SPEC HUM= .020000
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	218	219	220	221	222	223	224
PERCENT MAX. CORRECTED POWER	5.0	7.7	10.5	30.3	70.3	91.9	100.5
CORRECTED SHAFT HP	35.3	54.2	74.2	214.0	496.2	648.6	709.8
MEASURED SHAFT HP	35.0	53.6	73.3	210.9	488.2	641.7	702.2
SHAFT SPEED, N1, RPM	27550.0	27500.0	27520.0	41750.0	41710.0	41760.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	95.0	90.0	89.0	88.0	88.0	92.0	92.0
COMPRESSOR DSCHG. PRES.,PSIA	47.5	48.0	48.8	138.8	138.8	142.3	143.9
COMPRESSOR DSCHG. TEMP.,DEG F	313.0	312.0	311.0	616.0	620.0	629.0	631.0
TURB INTERSTAGE TEMP., DEG.F	907.0	986.0	1064.0	1121.0	1360.0	1488.0	1541.0
CORR BELLMTH FLOW, LB/SEC	2.93	2.95	2.98	7.74	7.74	7.69	7.69
FA RATIO BASED ON BELLMTH.	.0114	.0127	.0148	.0101	.0139	.0163	.0173
MEASURED FUEL FLOW, LB/HR	112.0	125.0	136.0	263.0	362.0	421.0	446.0
FA RATIO CALC. FROM EMISSION	.0106	.0116	.0132	.0100	.0137	.0162	.0171
EQUIVALENCE RATIO	.155	.170	.194	.147	.201	.238	.251
LOADING W/P**N/V/E(T/540)	.321	.318	.306	.083	.074	.069	.067
COMB EFFIC FROM EMISSIONS	99.226	99.353	99.496	99.806	99.950	99.972	99.976

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.19	2.41	2.75	2.10	2.88	3.43	3.61
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	348.7	389.9	425.2	826.6	1140.6	1327.1	1406.8
CARBON MONOXIDE							
PPM BY VOLUME, WET	220.4	206.8	192.4	61.8	27.5	19.8	17.4
LB. PER 1000 LB. OF FUEL	19.935	17.029	13.914	5.818	1.915	1.115	.969
WEIGHT FLOW, LB./HR.	2.229	2.128	1.892	1.530	.693	.469	.432
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	67.5	59.7	48.6	12.8	1.5	.6	.3
LB. PER 1000 LB. OF FUEL	3.484	2.818	2.009	.654	.068	.028	.018
WEIGHT FLOW, LB./HR.	.390	.351	.273	.172	.022	.008	.004
RATIO LB HC/LB CO	.1750	.1650	.1444	.1124	.0311	.0180	.0098
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.8	16.4	20.9	34.6	62.7	80.7	87.7
LB. PER 1000 LB. OF FUEL	2.077	2.218	2.683	5.449	7.167	7.768	8.014
WEIGHT FLOW, LB./HR.	.233	.277	.338	1.433	2.594	3.278	3.574
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.2	5.8	4.4	11.2	6.8	7.8	3.5
LB. PER 1000 LB. OF FUEL	.771	.784	.523	1.754	.685	.673	.328
WEIGHT FLOW, LB./HR.	.086	.098	.071	.461	.248	.284	.143
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	19.2	22.2	25.3	46.8	68.8	87.7	91.3
LB. PER 1000 LB. OF FUEL	2.848	3.002	3.205	7.203	7.852	8.442	8.334
WEIGHT FLOW, LB./HR.	.319	.375	.409	1.894	2.843	3.554	3.717
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00714	.00713	.00712	.00711	.00710	.00709	.00710
SMOKE NUMBER	0.00	1.20	0.00	3.60	4.80	4.80	3.60
CORRECTED WEIGHT FLOW	.02141	.02139	.02135	.02132	.02131	.02127	.02130
SMOKE NUMBER	1.20	2.40	2.40	18.70	13.10	11.90	11.98
CORRECTED WEIGHT FLOW	.03568	.03565	.03559	.03553	.03552	.03551	.03551
SMOKE NUMBER	2.40	3.60	2.40	16.70	19.80	14.90	16.70
CORRECTED WEIGHT FLOW	.04995	.04989	.04983	.04984	.04983	.04972	.04972
SMOKE NUMBER	3.60	3.60	3.60	28.20	21.40	21.40	28.80
SMOKE NUMBER AT WA=0.023	1.80	2.70	2.10	12.90	14.70	13.30	13.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-31-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 11
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.695	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.513	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	7.558	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.8	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869882-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 11 DATE: 10-31-75 TIME: BARO PRESS.: 28.680 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 65.00 PERCENT SPECIFIC HUMIDITY: .019286 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	225	226	227	228	229	230	231
ACTUAL POWER SETTING, HORSEPOWER	36.5	52.1	70.5	209.9	467.4	636.3	702.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.24	7.47	10.13	30.07	69.84	91.25	100.83
N1 SPEED, RPM	27560.00	27520.00	27550.00	41750.00	41750.00	41740.00	41770.00
FUEL FLOW (MEAS.) LB./HR.	117.0	127.0	136.0	270.0	369.0	425.0	452.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.9	7.8	7.7	7.7	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	90.00	91.00	89.00	92.00	92.00	91.00	90.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.10	14.10	14.10	14.10	14.10	14.10	14.10
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.84	48.53	49.36	130.26	137.67	141.70	144.40
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	310.00	310.00	310.00	618.00	622.00	627.00	631.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	920.0	988.0	1046.0	1127.0	1368.0	1479.0	1529.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.06	14.06	14.06	13.97	13.99	14.03	14.05
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	79.500	66.600	48.300	13.500	1.200	1.200	.600
CARBON MONOXIDE (CO), PPMV	228.026	221.365	195.179	63.974	29.583	19.039	17.026
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.300	23.300	26.900	49.200	72.750	88.250	93.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.175	2.336	2.698	2.132	2.916	3.419	3.641
NITRIC OXIDE (NO), PPMV	14.480	17.900	21.800	37.000	67.500	84.750	91.800
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.136	3.231	2.036	.724	.847	.848	.819
CARBON MONOXIDE (CO)	20.754	18.789	14.392	6.802	2.833	1.117	.938
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.035	3.249	3.258	7.583	8.213	8.585	8.419
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.484	.410	.277	.195	.317	.317	.289
CARBON MONOXIDE (CO)	2.428	2.386	1.957	1.821	.750	.475	.424
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.355	.413	.443	2.047	3.031	3.615	3.805
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.19	99.27	99.48	99.68	99.95	99.97	99.98
F/A (EMISSIONS,CALC)	.0105	.0113	.0129	.0102	.0139	.0162	.0172

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAGC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :10-31-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 11
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	115.709	115.709	269.280	415.387	456.760	
FUEL MASS, LB	13.499	36.641	20.196	17.388	3.886	91.451
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.223	4.223	.712	.125	.199	2.584
RATE, LB HC/HR	.489	.489	.192	.052	.091	.410
MASS, LB HC	.857	.155	.014	.002	.001	.229
MASS, PERCENT OF TOTAL CYCLE	24.9	67.6	6.3	.9	.3	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.605
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	20.822	20.822	5.946	.294	1.866	12.863
RATE, LB CO/HR	2.409	2.409	1.601	.122	.852	2.187
MASS, LB CO	.281	.763	.120	.005	.007	1.176
MASS, PERCENT OF TOTAL CYCLE	23.9	64.9	10.2	.4	.6	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.513
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.989	2.989	7.565	8.379	8.565	5.251
RATE, LB NOX/HR	.346	.346	2.037	3.481	3.912	.868
MASS, LB NOX	.040	.110	.153	.145	.033	.480
MASS, PERCENT OF TOTAL CYCLE	8.4	22.8	31.8	30.2	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						7.558

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	20.8	31.3
HC (IDLE)	4.2	5.9
NOX (TAKEOFF)	8.6	24.9

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 11
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 77. REL HUM= 65.00 SPEC HUM= .019286
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	225	226	227	228	229	230	231
PERCENT MAX. CORRECTED POWER	5.2	7.5	10.1	30.1	69.8	91.3	100.8
CORRECTED SHAFT HP	37.0	52.8	71.5	212.3	493.1	644.2	711.9
MEASURED SHAFT HP	36.5	52.1	70.5	209.9	487.4	636.3	702.5
SHAFT SPEED, N1, RPM	27560.0	27520.0	27550.0	41750.0	41750.0	41740.0	41770.0
COMPRESSOR INLET TEMP.,DEG.F	90.0	91.0	89.0	92.0	92.0	91.0	90.0
COMPRESSOR DSCHG. PRES.,PSIA	48.0	48.5	49.4	130.3	137.7	141.7	144.4
COMPRESSOR DSCHG. TEMP,DEG F	310.0	310.0	310.0	618.0	622.0	627.0	631.0
TURB INTERSTAGE TEMP., DEG.F	920.0	980.0	1046.0	1127.0	1360.0	1479.0	1529.0
CORR BELLMTH FLOW, LB/SEC	3.00	2.94	2.92	7.77	7.71	7.72	7.73
FA RATIO BASED ON BELLMTH.	.0116	.0129	.0139	.0104	.0143	.0164	.0174
MEASURED FUEL FLOW, LB/HR	117.0	127.8	136.0	270.0	369.0	425.0	452.8
FA RATIO CALC. FROM EMISSION	.0105	.0113	.0129	.0102	.0139	.0162	.0172
EQUIVALENCE RATIO	.154	.165	.190	.150	.203	.238	.253
LOADING W/P**N/V/E(T/540)	.325	.312	.302	.083	.074	.070	.067
COMB EFFIC FROM EMISSIONS	99.149	99.275	99.483	99.795	99.948	99.970	99.976

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.17	2.34	2.78	2.13	2.92	3.42	3.64
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	363.9	395.7	425.1	849.5	1162.6	1339.7	1424.9
CARBON MONOXIDE							
PPM BY VOLUME, WET	228.8	221.4	195.2	64.0	29.6	19.8	17.8
LB. PER 1000 LB. OF FUEL	20.754	18.789	14.392	6.802	2.833	1.117	.938
WEIGHT FLOW, LB./HR.	2.428	2.386	1.957	1.621	.750	.475	.424
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	79.5	66.6	48.3	13.5	1.2	1.2	.6
LB. PER 1000 LB. OF FUEL	4.136	3.231	2.036	.724	.047	.040	.019
WEIGHT FLOW, LB./HR.	.484	.418	.277	.195	.017	.017	.009
RATIO LB HC/LB CO	.1993	.1720	.1414	.1206	.0232	.0360	.0201
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.4	17.9	21.8	37.8	67.5	84.7	91.8
LB. PER 1000 LB. OF FUEL	2.153	2.496	2.641	5.782	7.628	8.168	8.238
WEIGHT FLOW, LB./HR.	.252	.317	.359	1.540	2.812	3.471	3.723
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.9	5.4	5.1	12.2	5.3	3.5	2.8
LB. PER 1000 LB. OF FUEL	.882	.753	.618	1.880	.593	.337	.181
WEIGHT FLOW, LB./HR.	.103	.096	.084	.508	.219	.143	.082
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.3	23.3	26.9	49.2	72.7	88.2	93.8
LB. PER 1000 LB. OF FUEL	3.035	3.249	3.258	7.583	8.213	8.505	8.419
WEIGHT FLOW, LB./HR.	.355	.413	.443	2.047	3.031	3.615	3.805
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00724	.00723	.00723	.00720	.00720	.00720	.00719
SMOKE NUMBER	1.20	1.20	1.20	7.10	6.00	6.00	6.00
CORRECTED WEIGHT FLOW	.02173	.02169	.02168	.02161	.02161	.02161	.02157
SMOKE NUMBER	4.80	3.60	3.60	11.90	13.10	10.70	12.50
CORRECTED WEIGHT FLOW	.03621	.03615	.03614	.03602	.03602	.03602	.03594
SMOKE NUMBER	6.00	6.00	6.00	19.00	28.80	17.90	16.70
CORRECTED WEIGHT FLOW	.05073	.05061	.05059	.05043	.05043	.05043	.05032
SMOKE NUMBER	6.00	6.00	6.50	21.40	27.40	22.00	20.60
SMOKE NUMBER AT MA=0.023	4.40	4.20	4.30	14.90	16.80	14.10	14.00

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P04801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 12
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	5.384	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	22.046	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	6.980	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	19.8	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 12 DATE: 11-3-75 TIME: BARO PRESS.: 28.980 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 79.00 PERCENT SPECIFIC HUMIDITY: .025000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	232	233	234	235	236	237	238
ACTUAL POWER SETTING, HORSEPOWER	34.1	52.1	72.1	204.7	487.3	629.4	784.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.86	7.45	10.27	29.13	69.42	89.62	100.42
N1 SPEED, RPM	27500.00	27530.00	27560.00	41770.00	41740.00	41750.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	117.0	132.0	141.0	278.0	381.0	438.0	467.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	3.0	2.9	7.8	7.8	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	90.00	87.00	90.00	91.00	90.00	88.00	89.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.19	14.19	14.19	14.19	14.19	14.19	14.19
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.77	49.61	50.05	132.37	140.57	146.17	146.88
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	380.00	269.00	294.00	601.00	602.00	600.00	601.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	883.0	954.0	1030.0	1110.0	1335.0	1412.0	1520.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.16	14.16	14.16	14.08	14.09	14.14	14.15
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	126.000	87.000	63.000	12.600	3.300	1.500	1.200
CARBON MONOXIDE (CO), PPMV	204.643	233.778	206.762	70.712	34.080	27.546	17.831
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.600	20.300	24.300	42.400	62.000	79.250	84.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.160	2.386	2.655	2.141	2.929	3.364	3.673
NITRIC OXIDE (NO), PPMV	12.800	15.300	19.000	31.500	59.750	72.500	79.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	6.573	4.128	2.695	.673	.129	.051	.037
CARBON MONOXIDE (CO)	24.153	19.435	15.476	6.603	2.333	1.642	.974
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.639	2.768	2.987	6.584	6.971	7.378	7.604
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.769	.545	.380	.187	.049	.022	.017
CARBON MONOXIDE (CO)	2.826	2.562	2.182	1.836	.889	.719	.455
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.309	.365	.421	1.808	2.656	3.228	3.551
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.86	99.18	99.48	99.79	99.93	99.96	99.97
F/A (EMISSIONS,CALC)	.0105	.0115	.0128	.0103	.0139	.0168	.0174

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****************************************** EPA CYCLE EMISSIONS COMPUTATION SUMMARY ******************************************
ENG MFG : AIRESEARCH          TEST FACIL : PHX LACC2  INSTR DESCRIP : FED REG V38 N136          CALC DATE :11-3-75
MODEL NO.:     TPE331-5-251M     S/N:   P04001          ENGINE TYPE(CLASS):  TURBOPROP          CALC ID:  1
RATED POWER:    706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS                                  TEST NO:  12
FUEL: ASTM D1655-73           ATOMIC H/C RATIO:   1.928     LHV: 18470. BTU/LB     ADDITIVES:  NONE
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M O D E	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	118.101	118.101	289.130	439.922	472.623	
FUEL MASS, LB	13.778	37.399	21.685	18.330	3.939	95.131
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	6.389	6.389	.651	.050	.032	3.596
RATE, LB HC/HR	.755	.755	.188	.022	.015	.613
MASS, LB HC	.088	.239	.014	.001	.000	.342
MASS, PERCENT OF TOTAL CYCLE	25.7	69.8	4.1	.3	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						5.384
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	23.838	23.838	6.690	1.683	1.237	14.725
RATE, LB CO/HR	2.815	2.815	1.934	.740	.585	2.589
MASS, LB CO	.328	.892	.145	.031	.005	1.401
MASS, PERCENT OF TOTAL CYCLE	23.4	63.6	10.4	2.2	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						22.046
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.646	2.646	6.594	7.374	7.594	4.662
RATE, LB NOX/HR	.313	.313	1.906	3.244	3.589	.794
MASS, LB NOX	.036	.099	.143	.135	.030	.443
MASS, PERCENT OF TOTAL CYCLE	8.2	22.3	32.2	30.5	6.7	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						6.980

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	23.8	29.7
HC (IDLE)	5.8	5.8
NOX (TAKEOFF)	7.6	24.9

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84081 COMB P/N= 869062-4 FUEL= AV. KERO. TEST NO.= 12
RAT SHP= 786. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 84. REL HUM= 79.00 SPEC HUM= .025000
FUEL H/C= 1.9260 STOI F/A= .066822 L H V= 18470. S LN T,F= 300.0 FLO,L/HR= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	232	233	234	235	236	237	238
PERCENT MAX. CORRECTED POWER	4.9	7.4	10.3	29.1	69.4	89.8	100.4
CORRECTED SHAFT HP	34.3	52.6	72.5	205.6	490.1	634.1	709.8
MEASURED SHAFT HP	34.1	52.1	72.1	204.7	487.3	629.4	704.3
SHAFT SPEED, N1, RPM	27509.0	27530.0	27580.0	41770.0	41740.0	41750.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	90.0	87.0	90.0	91.0	90.0	88.0	89.0
COMPRESSOR DSCHG. PRES.,PSIA	48.8	49.6	58.8	132.4	140.6	146.2	148.1
COMPRESSOR DSCHG. TEMP,DEG F	388.0	389.0	394.0	601.0	602.0	600.0	601.0
TURB INTERSTAGE TEMP., DEG.F	883.0	954.0	1038.0	1110.0	1335.0	1412.0	1528.0
CORR BELLMTH FLOW, LB/SEC	2.98	3.01	2.98	7.79	7.78	7.80	7.76
FA RATIO BASED ON BELLMTH.	.0116	.0129	.0143	.0196	.0145	.0166	.0177
MEASURED FUEL FLOW, LB/HR	117.0	132.0	141.8	278.0	381.0	438.0	467.0
FA RATIO CALC. FROM EMISSION	.0185	.0115	.0128	.0183	.0139	.0160	.0174
EQUIVALENCE RATIO	.194	.169	.187	.190	.284	.234	.255
LOADING W/P**N/V/E(T/540)	.323	.324	.306	.084	.076	.071	.069
COMB EFFIC FROM EMISSIONS	98.855	99.181	99.400	99.786	99.934	99.957	99.974

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.16	2.39	2.66	2.14	2.93	3.36	3.67
LB. CO2 PER LB. OF FUEL	3.10	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	362.5	410.8	440.2	873.4	1200.2	1380.3	1472.2
CARBON MONOXIDE							
PPM BY VOLUME, WET	264.6	233.8	206.8	70.7	34.1	27.5	17.8
LB. PER 1000 LB. OF FUEL	24.153	19.405	15.476	6.603	2.333	1.842	.974
WEIGHT FLOW, LB./HR.	2.826	2.562	2.182	1.836	.889	.719	.455
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	126.0	87.9	63.8	12.6	3.3	1.5	1.2
LB. PER 1000 LB. OF FUEL	6.573	4.128	2.695	.673	.129	.051	.037
WEIGHT FLOW, LB./HR.	.769	.545	.380	.187	.049	.022	.017
RATIO LB HC/LB CO	.2721	.2127	.1741	.1818	.0553	.0311	.0385
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	12.8	15.3	19.8	31.5	59.7	72.5	79.7
LB. PER 1000 LB. OF FUEL	1.919	2.086	2.326	4.832	6.718	7.180	7.156
WEIGHT FLOW, LB./HR.	.225	.275	.329	1.343	2.568	3.118	3.342
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.8	5.8	5.3	10.9	2.3	2.8	5.8
LB. PER 1000 LB. OF FUEL	.720	.682	.652	1.672	.253	.269	.449
WEIGHT FLOW, LB./HR.	.084	.090	.092	.465	.096	.118	.210
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	17.6	20.3	24.3	42.4	62.0	75.2	84.7
LB. PER 1000 LB. OF FUEL	2.639	2.768	2.987	6.504	6.971	7.378	7.604
WEIGHT FLOW, LB./HR.	.309	.365	.421	1.808	2.664	3.228	3.551
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00710	.00710	.00711	.00713	.00713	.00714	.00714
SMOKE NUMBER	.30	1.50	2.70	6.10	7.30	8.50	6.10
CORRECTED WEIGHT FLOW	.02130	.02130	.02134	.02140	.02139	.02143	.02143
SMOKE NUMBER	3.80	2.70	2.70	14.30	16.60	15.40	13.10
CORRECTED WEIGHT FLOW	.03543	.03550	.03557	.03567	.03572	.03571	.03571
SMOKE NUMBER	6.10	5.00	3.80	20.00	24.70	23.50	18.90
CORRECTED WEIGHT FLOW	.04961	.04979	.04979	.04992	.05001	.05000	.05000
SMOKE NUMBER	7.30	5.00	7.30	25.80	30.50	28.20	23.50
SMOKE NUMBER AT MA=0.823	4.40	3.60	4.10	16.60	19.80	18.90	19.50

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

AIRESEARCH EMISSION TEST SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PWA LAOC2 INSTR DESCRIP : FED REG V38 N130 CALC DATE :11-3-75
MODEL NO.: TPE331-9-291M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 12
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973
HYDROCARBONS (CH AS CH4) 4.822 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO) 20.879 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2) 6.709 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE 18.1 SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER
TAXI-IDLE SETTING: 9.8 PERCENT RATED TAKEOFF POWER AT 69. PERCENT RATED TAKEOFF N1 RPM

ENGINE DESCRIPTION

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SVR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

OPERATIONAL TEST DATA SUMMARY

GASEOUS EMISSION TEST NO.: 12 DATE: 11-3-75 TIME: BARO PRESS.: 28.980 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 79.00 PERCENT SPECIFIC HUMIDITY: .025000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.90 SEC. LENGTH: 50.00 FT.

COMPUTED EMISSIONS

TEST CONDITION	239	240	241	242	243	244	245
ACTUAL POWER SETTING, HORSEPOWER	35.0	91.7	78.3	289.9	488.6	628.7	782.6
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.95	7.35	10.80	29.95	49.66	89.72	100.27
N1 SPEED, RPM	27540.00	27560.00	27540.00	41760.00	41760.00	41760.00	41760.00
FUEL FLOW (MEAS.) LB./HR.	117.0	132.0	141.0	279.0	381.0	436.0	467.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	8.1	8.0	2.9	7.8	7.8	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	90.00	92.00	92.00	88.00	89.00	88.00	88.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.19	14.19	14.19	14.19	14.19	14.19	14.19
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.21	49.66	58.88	133.84	141.55	146.82	148.88
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	299.00	294.00	294.00	597.00	601.00	601.00	603.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	874.0	956.0	1030.0	1116.0	1331.0	1435.0	1515.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.18	14.18	14.18	14.99	14.99	14.13	14.15
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	112.500	75.000	60.000	9.000	1.500	.600	.600
CARBON MONOXIDE (CO), PPMV	249.300	234.259	208.652	74.093	34.000	23.000	22.675
TOTAL OXIDES OF NITROGEN (NOX), PPMV	17.100	19.300	22.400	43.600	64.250	75.000	82.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.165	2.396	2.623	2.199	3.003	3.451	3.673
NITRIC OXIDE (NO), PPMV	12.000	15.000	19.100	31.000	57.500	70.250	79.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	5.864	3.545	2.598	.468	.857	.820	.819
CARBON MONOXIDE (CO)	22.734	19.374	15.884	6.738	2.276	1.389	1.238
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.961	2.622	2.787	6.513	7.847	7.162	7.424
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.686	.468	.366	.138	.822	.899	.999
CARBON MONOXIDE (CO)	2.660	2.557	2.220	1.873	.867	.606	.578
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.388	.346	.393	1.811	2.689	3.123	3.467
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.95	99.23	99.48	99.88	99.94	99.97	99.97
F/A (EMISSIONS,CALC)	.0185	.0116	.0126	.0185	.0143	.0164	.0174

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PWK LAGCP INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/NO: P84881 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 12
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.116	11.178	15.865	26.475	5.883	63.548
FUEL FLOW, LB/HR	117.139	117.139	278.611	430.000	470.421	
FUEL MASS, LB	13.666	37.094	20.896	10.284	3.920	93.860
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	5.839	5.839	.450	.814	.048	3.264
RATE, LB HC/HR	.684	.684	.120	.086	.023	.549
MASS, LB HC	.080	.217	.010	.008	.000	.386
MASS, PERCENT OF TOTAL CYCLE	20.0	70.7	3.1	.1	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.822
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	22.709	22.709	6.752	1.487	1.448	14.134
RATE, LB CO/HR	2.660	2.660	1.881	.652	.681	2.376
MASS, LB CO	.310	.842	.141	.027	.006	1.327
MASS, PERCENT OF TOTAL CYCLE	23.4	63.5	10.6	2.0	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						20.879
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.562	2.562	6.518	7.169	7.418	4.942
RATE, LB NOX/HR	.300	.300	1.816	3.144	3.486	.744
MASS, LB NOX	.035	.095	.136	.131	.029	.426
MASS, PERCENT OF TOTAL CYCLE	8.2	22.3	32.0	30.7	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						6.709

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

POLLUTANT	EPA LTO-CYCLE LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

POLLUTANT (MODE)	REQUIRED EMISSION INDEX, LBP/1000 LB FUEL A	B
CO (IDLE)	22.7	38.1
HC (IDLE)	5.8	9.9
NOX (TAKEOFF)	7.4	29.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P3-801 COMB P/N= 869882-4 FUEL= AV. KERO. TEST NO.= 12

RAT SHP= 780. RA EST.P= 1058. RAT SPD= 41738. DEW PT.F= 64. REL HUM= 79.88 SPEC HUM= .025888

FUEL H/C= 1.9289 STOI F/A= .06822 L H V= 18478. S LN T,F= 380.0 FLO.L/H= 14.168 SL TIM.S= 6.5888

DATA POINT NUMBER	239	240	241	242	243	244	245
PERCENT MAX. CORRECTED POWER	5.0	7.3	10.0	30.0	69.7	89.7	100.3
CORRECTED SHAFT HP	35.2	51.9	70.6	211.5	491.8	633.5	707.9
MEASURED SHAFT HP	35.0	51.7	70.3	209.9	488.6	628.7	702.6
SHAFT SPEED, N1, RPM	27540.0	27560.0	27540.0	41750.0	41740.0	41740.0	41780.0
COMPRESSOR INLET TEMP.,DEG.F	90.0	92.0	92.0	88.0	89.0	88.0	88.0
COMPRESSOR DSCHG. PRES.,PSIA	49.2	49.7	50.0	133.6	141.6	146.0	148.1
COMPRESSOR DSCHG. TEMP,DEG F	289.0	294.0	294.0	597.0	601.0	601.0	603.0
TURB INTERSTAGE TEMP.. DEG.F	874.0	956.0	1038.0	1116.0	1331.0	1435.0	1515.0
CORR BELLMTH FLOW, LB/SEC	3.85	2.98	2.99	7.81	7.80	7.81	7.82
FA RATIO BASED ON BELLMTH.	.0114	.0131	.0142	.0185	.0144	.0165	.0177
MEASURED FUEL FLOW, LB/HR	117.0	132.0	141.0	278.0	381.0	436.0	467.0
FA RATIO CALC. FROM EMISSION	.0185	.0116	.0126	.0185	.0143	.0164	.0174
EQUIVALENCE RATIO	.194	.169	.185	.194	.289	.248	.255
LOADING W/P**N/V/E(T/540)	.332	.316	.309	.084	.075	.071	.069
COMB EFFIC FROM EMISSIONS	98.951	99.238	99.408	99.888	99.941	99.966	99.969

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.17	2.48	2.62	2.28	3.08	3.45	3.67
LB. CO2 PER LB. OF FUEL	3.10	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	363.0	411.0	440.2	873.5	1200.3	1374.2	1472.8
CARBON MONOXIDE							
PPM BY VOLUME, WET	249.3	234.3	288.7	74.1	34.1	23.9	22.7
LB. PER 1000 LB. OF FUEL	22.734	19.374	15.884	6.736	2.276	1.389	1.238
WEIGHT FLOW, LB./HR.	2.668	2.557	2.228	1.873	.867	.606	.578
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	112.9	75.0	60.8	9.0	1.9	.6	.6
LB. PER 1000 LB. OF FUEL	5.864	3.545	2.596	.466	.057	.020	.019
WEIGHT FLOW, LB./HR.	.686	.468	.366	.130	.022	.009	.009
RATIO LB HC/LB CO	.2579	.1830	.1644	.0694	.0252	.0144	.0151
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	12.8	15.8	19.1	31.8	57.5	78.2	79.7
LB. PER 1000 LB. OF FUEL	1.797	2.038	2.376	4.751	6.387	6.788	7.155
WEIGHT FLOW, LB./HR.	.210	.269	.335	1.321	2.483	2.925	3.341
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.1	4.8	3.8	11.6	6.8	4.8	3.8
LB. PER 1000 LB. OF FUEL	.764	.584	.411	1.763	.748	.454	.269
WEIGHT FLOW, LB./HR.	.089	.077	.058	.490	.282	.198	.126
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	17.1	19.3	22.4	43.6	64.2	75.8	82.7
LB. PER 1000 LB. OF FUEL	2.561	2.622	2.787	6.513	7.047	7.162	7.424
WEIGHT FLOW, LB./HR.	.300	.346	.393	1.811	2.685	3.123	3.467
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.08714	.08714	.08714	.08713	.08713	.08713	.08712
SMOKE NUMBER	3.80	2.78	3.80	7.30	9.60	5.80	6.10
CORRECTED WEIGHT FLOW	.02142	.02142	.02142	.02140	.02140	.02140	.02136
SMOKE NUMBER	9.00	9.00	9.00	13.10	15.40	15.40	13.10
CORRECTED WEIGHT FLOW	.03578	.03578	.03578	.03567	.03567	.03567	.03567
SMOKE NUMBER	6.10	7.30	5.00	17.70	21.20	20.80	21.20
CORRECTED WEIGHT FLOW	.04998	.04998	.04998	.04993	.04993	.04993	.04993
SMOKE NUMBER	9.60	7.30	6.10	29.30	25.80	24.70	23.50
SMOKE NUMBER AT WA=0.823	6.20	5.60	5.80	16.90	18.10	16.40	16.10

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

**** AIRESEARCH EMISSION TEST SUMMARY ****

ENG MFG : AIRESEARCH TEST FACIL : PH4 LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 12
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

**** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ****

HYDROCARBONS (CH AS CH4)	9.139	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	20.652	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	6.588	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	18.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

**** ENGINE DESCRIPTION ****

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:
USER: MODEL NO.:
ENGINE INSTALLATION POSITION:

**** OPERATIONAL TEST DATA SUMMARY ****

GASEOUS EMISSION TEST NO.: 12 DATE: 11-3-75 TIME: BARO PRESS.: 28.960 IN. HGA.
AMBIENT AIR TEMP.: 91.00 DEG. F RELATIVE HUMIDITY: 79.00 PERCENT SPECIFIC HUMIDITY: .025000 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

**** COMPUTED EMISSIONS ****

TEST CONDITION	246	247	248	249	250	251	252
ACTUAL POWER SETTING, HORSEPOWER	36.6	52.8	73.3	214.8	486.3	628.7	702.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.21	7.39	10.42	30.51	69.06	89.13	99.58
N1 SPEED, RPM	27530.00	27548.00	27530.00	41760.00	41760.00	41748.00	41778.00
FUEL FLOW (MEAS.) LB./HR.	119.8	132.8	141.8	281.8	375.8	426.8	462.8
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.8	3.8	2.9	7.8	7.8	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	90.00	90.00	90.00	91.00	91.00	93.00	93.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.22	14.22	14.22	14.22	14.22	14.22	14.22
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.46	49.95	98.79	136.43	142.44	145.63	147.84
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	288.00	288.00	290.00	600.00	602.00	605.00	607.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	908.0	958.0	1038.0	1129.0	1335.0	1454.0	1524.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.21	14.21	14.21	14.11	14.12	14.16	14.17
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	117.000	90.000	66.000	9.300	3.300	3.000	2.400
CARBON MONOXIDE (CO), PPMV	253.237	241.507	217.108	65.235	25.513	21.461	17.026
TOTAL OXIDES OF NITROGEN (NOX), PPMV	16.700	18.700	21.000	42.400	63.000	74.000	83.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.218	2.406	2.668	2.194	2.946	3.364	3.615
NITRIC OXIDE (NO), PPMV	11.600	13.900	16.900	31.800	50.000	70.750	70.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	9.932	6.233	2.673	.685	.128	.102	.076
CARBON MONOXIDE (CO)	22.548	19.673	16.534	9.948	1.737	1.288	.945
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.442	2.928	2.627	6.358	7.845	7.248	7.567
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.788	.559	.485	.136	.848	.844	.835
CARBON MONOXIDE (CO)	2.682	2.623	2.331	1.671	.651	.545	.437
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.291	.334	.378	1.784	2.642	3.088	3.496
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.95	99.16	99.36	99.82	99.95	99.96	99.97
F/A (EMISSIONS,CALC)	.0168	.0116	.0125	.0185	.0148	.0160	.0171

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P84801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: B
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 12
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	39.300	39.300	211.000	635.400	786.000	
HP-HR	4.110	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	117.344	117.344	274.583	434.954	456.755	
FUEL MASS, LB	13.698	37.159	20.594	18.123	3.896	93.372
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	6.173	6.173	.439	.099	.077	3.494
RATE, LB HC/HR	.724	.724	.187	.043	.035	.584
MASS, LB HC	.085	.229	.010	.002	.000	.326
MASS, PERCENT OF TOTAL CYCLE	25.9	70.3	3.2	.5	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						5.135
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	22.826	22.826	9.918	1.489	.681	14.854
RATE, LB CO/HR	2.679	2.679	1.625	.648	.311	2.398
MASS, LB CO	.313	.848	.122	.027	.083	1.312
MASS, PERCENT OF TOTAL CYCLE	23.8	64.6	9.3	2.1	.2	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						20.692
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.427	2.427	6.282	7.277	7.579	6.429
RATE, LB NOX/HR	.285	.285	1.725	3.165	3.462	.741
MASS, LB NOX	.033	.090	.129	.132	.029	.414
MASS, PERCENT OF TOTAL CYCLE	8.0	21.8	31.3	31.9	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						6.508

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.6
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	22.6	38.5
HC (IDLE)	5.9	5.9
NOX (TAKEOFF)	7.6	26.7

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 12

RAT SHP= 796. RA EGT,F= 1650. RAT SPD= 41738. DEW PT,F= 84. REL HUM= 79.88 SPEC HUM= .025888

FUEL M/C= 1.9288 STOI F/A= .06822 L H V= 18478. S LN T,F= 308.8 FLO,L/HR= 14.160 SL TIM,S= 6.5888

DATA POINT NUMBER	246	247	248	249	250	251	252
PERCENT MAX. CORRECTED POWER	5.2	7.4	10.4	30.5	69.1	89.1	99.6
CORRECTED SHAFT HP	36.8	52.2	73.5	215.4	487.6	629.3	703.1
MEASURED SHAFT HP	36.4	52.0	73.3	214.8	486.3	628.7	702.5
SHAFT SPEED, N1, RPM	27530.0	27540.3	27530.0	41780.0	41760.0	41748.0	41778.0
COMPRESSOR INLET TEMP.,DEG.F	90.0	90.0	90.0	91.0	91.0	93.0	93.3
COMPRESSOR DSCHG. PRES.,PSIA	49.5	50.0	50.8	134.4	142.4	145.6	147.8
COMPRESSOR DSCHG. TEMP,DEG F	288.0	288.0	290.0	688.0	682.0	685.0	687.0
TURB INTERSTAGE TEMP., DEG.F	980.0	950.0	1030.0	1120.0	1335.0	1454.0	1524.0
CORR BELLMTH FLOW, LB/SEC	3.02	2.99	2.98	7.82	7.77	7.76	7.76
FA RATIO BASED ON BELLMTH.	.0117	.0131	.0142	.0186	.0143	.0163	.0176
MEASURED FUEL FLOW, LB/HR	119.0	132.0	141.0	281.0	375.0	426.0	462.0
FA RATIO CALC. FROM EMISSION	.0136	.0116	.0125	.0185	.0148	.0169	.0171
EQUIVALENCE RATIO	.156	.170	.184	.154	.205	.234	.291
LOADING W/P**N/V/EXT/SAT)	.327	.316	.302	.883	.874	.878	.868
COMB EFFIC FROM EMISSIONS	98.948	99.161	99.359	99.818	99.948	99.961	99.971

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.22	2.41	2.61	2.19	2.99	3.36	3.62
LB. CO2 PER LB. OF FUEL	3.10	3.11	3.12	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	369.2	410.7	439.9	883.3	1181.6	1342.7	1456.4
CARBON MONOXIDE							
PPM BY VOLUME, WET	293.2	241.5	217.1	69.2	29.5	21.5	17.8
LB. PER 1000 LB. OF FUEL	22.540	19.873	16.534	5.948	1.737	1.288	.945
WEIGHT FLOW, LB./HR.	2.682	2.623	2.331	1.671	.651	.545	.437
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	117.0	90.0	66.0	9.3	3.3	3.0	2.4
LB. PER 1000 LB. OF FUEL	9.992	4.283	2.873	.489	.128	.102	.076
WEIGHT FLOW, LB./HR.	.788	.559	.409	.136	.068	.044	.035
RATIO LB HC/LB CO	.2641	.2138	.1736	.0815	.0739	.0799	.0806
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	11.6	13.9	18.9	31.8	58.8	70.7	78.7
LB. PER 1000 LB. OF FUEL	1.646	1.879	2.364	4.763	6.486	6.930	7.179
WEIGHT FLOW, LB./HR.	.282	.248	.333	1.338	2.432	2.952	3.317
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.1	4.8	2.1	10.6	5.8	3.3	4.3
LB. PER 1000 LB. OF FUEL	.746	.649	.263	1.588	.559	.318	.387
WEIGHT FLOW, LB./HR.	.089	.086	.037	.446	.210	.136	.179
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	16.7	18.7	21.0	42.4	63.8	74.0	83.0
LB. PER 1000 LB. OF FUEL	2.442	2.528	2.627	6.350	7.045	7.248	7.567
WEIGHT FLOW, LB./HR.	.291	.334	.370	1.784	2.642	3.088	3.496
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00714	.00713	.00718	.00710	.00708	.00707	.00707
SMOKE NUMBER	2.78	3.88	1.58	5.88	7.38	7.38	8.58
CORRECTED WEIGHT FLOW	.02143	.02139	.02131	.02129	.02125	.02120	.02121
SMOKE NUMBER	7.38	2.78	5.88	14.38	16.68	11.98	11.98
CORRECTED WEIGHT FLOW	.03571	.03565	.03552	.03548	.03541	.03534	.03535
SMOKE NUMBER	3.88	5.88	6.18	21.28	22.48	28.88	18.98
CORRECTED WEIGHT FLOW	.05000	.04991	.04972	.04967	.04958	.04948	.04949
SMOKE NUMBER	7.38	8.18	7.38	27.98	27.88	23.58	23.58
SMOKE NUMBER AT WA=8.023	9.38	4.48	9.88	17.88	18.58	15.68	15.68

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-7-75
MODEL NO.: TPE331-5-251M S/N: P34381 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 13
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	6.455	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.142	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	6.837	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	11.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 8030924 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 13 DATE: 11-7-75 TIME: BARO PRESS.: 22.830 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	253	254	255	256	257	258	259
ACTUAL POWER SETTING, HORSEPOWER	26.7	41.2	53.3	156.1	377.3	479.5	545.9
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.96	7.66	9.93	29.35	69.96	88.92	101.24
N1 SPEED, RPM	27580.00	27560.00	27550.00	41750.00	41750.00	41760.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	82.0	89.0	95.0	214.0	290.0	329.0	353.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.6	2.7	2.6	7.7	7.7	7.7	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	57.00	56.00	59.00	60.00	60.00	60.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	11.21	11.21	11.21	11.21	11.21	11.21	11.21
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	34.63	35.61	35.61	106.24	112.62	115.00	116.55
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	319.00	318.00	318.00	643.00	656.00	662.00	666.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	923.0	995.0	1070.0	1122.0	1346.0	1455.0	1542.0
EXHAUST GAS STATIC PRESSURE, PSIA	11.21	11.20	11.21	11.09	11.10	11.13	11.14
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	210.000	94.500	60.000	20.700	4.200	2.700	2.100
CARBON MONOXIDE (CO), PPMV	308.916	261.651	231.378	108.312	40.657	25.513	23.079
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.400	25.000	28.200	54.100	82.500	99.250	111.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.117	2.376	2.557	2.056	2.812	3.243	3.532
NITRIC OXIDE (NO), PPMV	16.900	21.000	26.100	36.400	78.000	97.500	109.000
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	11.187	4.496	2.621	1.148	.171	.095	.069
CARBON MONOXIDE (CO)	28.585	21.778	17.686	10.589	2.898	1.578	1.311
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.253	3.418	3.541	8.622	9.658	10.084	10.378
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.911	.400	.249	.246	.050	.031	.024
CARBON MONOXIDE (CO)	2.344	1.936	1.680	2.269	.840	.519	.463
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.267	.304	.336	1.845	2.801	3.317	3.663
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.35	99.03	99.35	99.65	99.92	99.95	99.96
F/A (EMISSIONS,CALC)	.0184	.0115	.0125	.0099	.0134	.0154	.0157

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-7-79
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 13
FUEL: ASTM D1655-78 ATOMIC H/C RATIO: 1.926 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	82.125	82.125	219.472	335.454	361.020	
FUEL MASS, LB	9.581	26.086	16.468	13.977	3.008	69.834
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	10.940	10.940	.858	.296	.836	5.941
RATE, LB HC/HR	.898	.898	.188	.899	.302	.735
MASS, LB HC	.105	.285	.014	.884	.003	.410
MASS, PERCENT OF TOTAL CYCLE	25.6	69.4	3.4	1.8	.6	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						6.455
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	28.450	28.450	10.542	1.771	1.845	17.619
RATE, LB CO/HR	2.336	2.336	2.314	.594	.666	2.178
MASS, LB CO	.273	.740	.174	.025	.006	1.216
MASS, PERCENT OF TOTAL CYCLE	22.4	60.8	14.3	2.0	.5	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.142
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.250	3.250	8.774	18.198	18.525	6.293
RATE, LB NOX/HR	.268	.268	1.926	3.418	3.688	.778
MASS, LB NOX	.031	.085	.144	.142	.032	.434
MASS, PERCENT OF TOTAL CYCLE	7.2	19.5	33.2	32.6	7.3	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						6.837

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS F2 ENGINES **

EPA LTO-CYCLE POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL POLLUTANT (MODE)	A	B
CO (IDLE)	28.5	42.1
HC (IDLE)	8.3	6.2
NOX (TAKEOFF)	18.5	33.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

ACCOTH

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*** AIRESEARCH EMISSION TEST SUMMARY ***

ENGINE= TFE331-5-251M S/N= P0-001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 13
RAT SHP= 706. RA EGT,F= 1050. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9200 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	253	254	255	256	257	258	259
PERCENT MAX. CORRECTED POWER	5.0	7.7	9.9	29.3	70.0	88.9	101.2
CORRECTED SHAFT HP	35.0	54.1	70.1	207.2	494.0	627.0	714.0
MEASURED SHAFT HP	26.7	41.2	53.3	158.1	377.3	479.5	545.9
SHAFT SPEED, N1, RPM	27590.0	27583.3	27550.0	41750.0	41750.0	41760.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	57.0	56.0	59.0	60.0	60.0	60.0
COMPRESSOR DSCHG. PRES.,PSIA	34.6	35.6	35.6	106.2	112.6	115.1	116.6
COMPRESSOR DSCHG. TEMP,DEG F	319.0	314.0	318.0	643.0	656.0	662.0	666.0
TURB INTERSTAGE TEMP., DEG.F	923.0	995.0	1070.0	1122.0	1346.0	1455.0	1542.0
CORR BELMTH FLOW, LB/SEC	2.80	2.67	2.64	7.69	7.68	7.66	7.63
FA RATIO BASED ON BELLMTH.	.0107	.0121	.0130	.0101	.0130	.0156	.0169
MEASURED FUEL FLOW, LB/HR	82.0	89.0	95.0	214.0	290.0	329.0	353.0
FA RATIO CALC. FROM EMISSION	.0104	.0115	.0125	.0099	.0134	.0154	.0167
EQUIVALENCE RATIO	.152	.168	.183	.145	.196	.226	.245
LOADING W/P**N/V/E(T/540)	.434	.395	.392	.092	.081	.077	.074
COMB EFFIC FROM EMISSIONS	98.353	99.093	98.354	99.652	99.917	99.955	99.963

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.12	2.38	2.60	2.86	2.81	3.24	3.53
LB. CO2 PER LB. OF FUEL	3.08	3.11	3.12	3.13	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	252.4	276.6	296.3	670.0	913.2	1035.8	1112.6
CARBON MONOXIDE							
PPM BY VOLUME, WET	308.9	261.7	231.4	108.3	40.7	25.5	23.1
LB. PER 1000 LB. OF FUEL	25.595	21.779	17.686	10.509	2.898	1.578	1.311
WEIGHT FLOW, LB./HR.	2.344	1.938	1.680	2.249	.840	.519	.463
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	216.0	94.5	60.0	20.7	4.2	2.7	2.1
LB. PER 1000 LB. OF FUEL	11.107	4.496	2.621	1.148	.171	.095	.068
WEIGHT FLOW, LB./HR.	.911	.400	.249	.246	.050	.031	.024
RATIO LB HC/LB CO	.3886	.2064	.1482	.1092	.0590	.0605	.0520
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	16.8	21.9	26.1	36.8	76.0	97.5	109.0
LB. PER 1000 LB. OF FUEL	2.554	2.980	3.277	5.865	9.132	9.906	10.160
WEIGHT FLOW, LB./HR.	.209	.265	.311	1.255	2.646	3.259	3.589
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.6	3.2	2.1	17.3	4.5	1.8	2.3
LB. PER 1000 LB. OF FUEL	.699	.439	.264	2.757	.527	.178	.210
WEIGHT FLOW, LB./HR.	.057	.039	.025	.590	.153	.058	.074
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.4	25.0	28.2	54.1	82.5	99.2	111.2
LB. PER 1000 LB. OF FUEL	3.253	3.419	3.541	8.622	9.658	10.084	10.378
WEIGHT FLOW, LB./HR.	.267	.304	.336	1.845	2.801	3.317	3.663
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00716	.00714	.00714	.00703	.00704	.00703	.00703
SMOKE NUMBER	4.10	3.50	3.50	2.40	4.70	4.70	4.70
CORRECTED WEIGHT FLOW	.02147	.02142	.02142	.02109	.02113	.02110	.02110
SMOKE NUMBER	7.10	3.50	2.40	7.10	9.40	9.40	7.10
CORRECTED WEIGHT FLOW	.03577	.03571	.03571	.03515	.03521	.03517	.03517
SMOKE NUMBER	7.10	6.50	3.50	9.20	14.10	14.10	14.10
CORRECTED WEIGHT FLOW	.04939	.04999	.04999	.04921	.04930	.04924	.04924
SMOKE NUMBER	9.40	9.20	8.20	11.20	18.80	17.60	16.50
SMOKE NUMBER AT WA=0.323	6.98	5.50	4.40	7.30	11.90	11.60	10.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-7-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: Z
RATED POWER: 706.3 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 13
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	6.241	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.313	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	6.509	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	13.4	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 13 DATE: 11-7-75 TIME: BARO PRESS.: 22.830 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	260	261	262	263	264	265	266
ACTUAL POWER SETTING, HORSEPOWER	26.7	41.7	53.9	165.7	380.5	481.3	540.4
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.97	7.76	10.05	30.73	70.57	89.25	100.21
N1 SPEED, RPM	27570.00	27540.00	27590.00	41750.00	41740.00	41740.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	82.0	90.0	96.0	215.0	289.0	327.0	352.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.8	2.6	2.7	7.7	7.6	7.7	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	55.00	55.00	55.00	60.00	60.00	60.00	60.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	11.21	11.21	11.21	11.21	11.21	11.21	11.21
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	35.12	35.51	35.85	106.09	112.13	114.54	115.91
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	317.00	316.00	317.00	645.00	656.00	661.00	663.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	913.0	996.0	1066.0	1129.0	1338.0	1459.0	1526.0
EXHAUST GAS STATIC PRESSURE, PSIA	11.21	11.21	11.20	11.10	11.11	11.13	11.15
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	198.000	93.000	67.500	21.300	4.500	2.700	2.400
CARBON MONOXIDE (CO), PPMV	294.719	269.192	234.741	109.177	39.421	27.953	24.701
TOTAL OXIDES OF NITROGEN (NOX), PPMV	28.800	24.900	29.280	54.750	83.250	99.500	107.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.188	2.366	2.606	2.103	2.812	3.273	3.462
NITRIC OXIDE (NO), PPMV	17.800	22.200	27.300	38.250	76.750	97.500	105.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	18.531	4.442	2.936	1.155	.183	.095	.079
CARBON MONOXIDE (CO)	27.425	22.498	17.864	10.356	2.818	1.713	1.423
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.179	3.418	3.650	6.531	9.747	10.815	10.173
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.864	.400	.282	.248	.053	.031	.028
CARBON MONOXIDE (CO)	2.249	2.024	1.715	2.227	.812	.560	.501
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.261	.308	.350	1.404	2.817	3.275	3.581
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.43	99.08	99.32	99.66	99.92	99.95	99.96
F/A (EMISSIONS,CALC)	.0103	.0114	.0126	.0101	.0134	.0155	.0165

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****************************************** EPA CYCLE EMISSIONS COMPUTATION SUMMARY ******************************************
ENG MFG : AIRESEARCH          TEST FACIL : PHX LACC2  INSTR DESCRIP : FED FEG V38 N136              CALC DATE :11-7-75
MODEL NO.:     TPE331-5-251M     S/N:  P34001              ENGINE TYPE(CLASS): TURBOPROP           CALC ID:  2
RATED POWER:    706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS                                     TEST NO:  13
FUEL: ASTM D1655-73           ATOMIC H/C RATIO:  1.928     LHV: 18470. BTU/LB     ADDITIVES:  NONE
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MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	82.089	82.089	209.255	331.030	353.029	
FUEL MASS, LB	9.577	25.995	15.694	13.793	2.942	68.001
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	10.437	10.437	1.489	.129	.058	5.832
RATE, LB HC/HR	.857	.857	.312	.043	.020	.710
MASS, LB HC	.100	.271	.023	.002	.000	.397
MASS, PERCENT OF TOTAL CYCLE	25.2	68.4	5.9	.4	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						6.241
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	27.385	27.385	9.939	2.074	1.663	17.112
RATE, LB CO/HR	2.248	2.248	2.080	.687	.587	2.084
MASS, LB CO	.262	.712	.156	.029	.005	1.164
MASS, PERCENT OF TOTAL CYCLE	22.5	61.2	13.4	2.5	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.313
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.182	3.182	8.401	10.047	10.182	6.082
RATE, LB NOX/HR	.261	.261	1.758	3.326	3.594	.741
MASS, LB NOX	.030	.083	.132	.139	.030	.414
MASS, PERCENT OF TOTAL CYCLE	7.4	20.0	31.9	33.5	7.2	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						6.509

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	27.4	42.5
HC (IDLE)	8.2	8.0
NOX (TAKEOFF)	10.2	34.7

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AiReSEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P3-001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 13
RAT SHP= 706. RA EGT,F= 1550. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 C H V= 18470. S LN T,F= 388.8 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	260	261	262	263	264	265	266
PERCENT MAX. CORRECTED POWER	5.0	7.8	10.0	30.7	70.6	89.3	100.2
CORRECTED SHAFT HP	35.1	54.8	70.9	216.9	498.2	630.1	707.5
MEASURED SHAFT HP	26.7	41.7	53.9	165.7	380.5	481.3	540.4
SHAFT SPEED, N1, RPM	27570.0	27540.0	27590.0	41750.0	41740.0	41740.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	55.0	55.0	55.0	60.0	60.0	60.0	60.0
COMPRESSOR DSCHG. PRES.,PSIA	35.1	35.5	35.9	106.1	112.1	114.5	115.9
COMPRESSOR DSCHG. TEMP,DEG F	317.0	316.0	317.0	645.0	656.0	661.0	663.0
TURB INTERSTAGE TEMP., DEG.F	913.0	996.0	1066.0	1129.0	1338.0	1439.0	1526.0
CORR BELLMTH FLOW, LB/SEC	2.81	2.64	2.68	7.66	7.64	7.66	7.68
FA RATIO BASED ON BELLMTH.	.0106	.0124	.0133	.0102	.0138	.0156	.0169
MEASURED FUEL FLOW, LB/HR	82.0	90.8	96.0	215.0	289.8	327.8	352.8
FA RATIO CALC. FROM EMISSION	.0103	.0114	.0126	.0101	.0134	.0155	.0165
EQUIVALENCE RATIO	.151	.168	.184	.148	.196	.228	.242
LOADING W/P**N/V/E(T/540)	.428	.394	.394	.091	.081	.078	.075
COMB EFFIC FROM EMISSIONS	98.431	99.381	99.322	99.655	99.918	99.951	99.960

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.11	2.37	2.61	2.10	2.81	3.27	3.48
LB. CO2 PER LB. OF FUEL	3.08	3.11	3.12	3.13	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	252.7	279.6	299.3	673.9	910.1	1030.4	1109.4
CARBON MONOXIDE							
PPM BY VOLUME, WET	294.7	269.2	234.7	189.2	39.4	28.0	24.7
LB. PER 1000 LB. OF FUEL	27.425	22.490	17.864	10.356	2.818	1.713	1.423
WEIGHT FLOW, LB./HR.	2.249	2.024	1.715	2.227	.812	.560	.501
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	198.8	93.8	67.5	21.3	4.5	2.7	2.4
LB. PER 1000 LB. OF FUEL	18.531	4.442	2.936	1.155	.183	.095	.079
WEIGHT FLOW, LB./HR.	.864	.408	.282	.246	.053	.031	.028
RATIO LB HC/LB CO	.3840	.1975	.1644	.1115	.0652	.0552	.0555
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	17.0	22.2	27.3	38.2	76.7	97.5	105.7
LB. PER 1000 LB. OF FUEL	2.538	3.047	3.413	5.960	8.986	9.814	10.007
WEIGHT FLOW, LB./HR.	.213	.274	.328	1.281	2.597	3.289	3.523
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	3.5	2.7	1.9	16.5	6.5	2.8	1.8
LB. PER 1000 LB. OF FUEL	.561	.371	.238	2.571	.761	.281	.166
WEIGHT FLOW, LB./HR.	.048	.033	.023	.553	.220	.066	.058
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.8	24.9	29.2	54.7	83.2	99.5	107.5
LB. PER 1000 LB. OF FUEL	3.179	3.418	3.650	8.531	9.747	10.015	10.173
WEIGHT FLOW, LB./HR.	.261	.308	.350	1.834	2.817	3.275	3.581
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00711	.00718	.00789	.00701	.00701	.00702	.00702
SMOKE NUMBER	4.70	7.10	3.50	3.50	3.50	3.50	2.40
CORRECTED WEIGHT FLOW	.02134	.02130	.02127	.02102	.02106	.02106	.02106
SMOKE NUMBER	7.10	7.10	3.50	5.90	10.60	8.20	8.20
CORRECTED WEIGHT FLOW	.03557	.03551	.03544	.03504	.03511	.03511	.03511
SMOKE NUMBER	5.20	5.90	5.90	7.10	17.60	15.30	12.90
CORRECTED WEIGHT FLOW	.04980	.04971	.04962	.04906	.04915	.04915	.04924
SMOKE NUMBER	13.60	8.20	7.10	14.10	21.20	18.80	21.20
SMOKE NUMBER AT WA=0.023	7.79	7.10	5.80	7.60	13.40	11.70	11.40

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAC02 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-8-75 1
MODEL NO.: TPE331-5-251M S/N: P0-031 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 13
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********
HYDROCARBONS (CH AS CH4) 6.237 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO) 19.637 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2) 6.645 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE 14.5 SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER
TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 85. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 13 DATE: 1-8-75 TIME: BARO PRESS.: 22.850 IN. HGA.
AMBIENT AIR TEMP.: 60.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. F.CARATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	267	268	269	270	271	272	273
ACTUAL POWER SETTING, HORSEPOWER	26.7	41.8	53.8	162.8	376.9	484.8	540.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.97	7.62	9.98	30.17	69.83	89.83	100.14
N1 SPEED, RPM	27570.00	27560.00	27540.00	41730.00	41730.00	41748.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	82.0	89.0	96.0	211.0	286.0	329.5	350.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.6	2.7	2.6	7.7	7.6	7.6	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	55.00	57.00	59.00	60.00	60.00	60.00	60.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	11.21	11.21	11.21	11.21	11.21	11.21	11.21
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	35.51	35.36	35.36	106.34	111.98	115.42	116.65
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	315.00	317.00	321.00	650.00	658.00	663.00	666.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	915.0	996.0	1073.0	1073.0	1335.0	1465.0	1523.0
EXHAUST GAS STATIC PRESSURE, PSIA	11.22	11.22	11.21	11.18	11.10	11.14	11.16
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	201.000	81.000	57.000	18.900	3.000	2.100	2.100
CARBON MONOXIDE (CO), PPMV	315.857	255.209	237.151	115.244	44.374	26.325	25.513
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.200	26.000	30.000	54.700	61.500	97.500	108.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.394	2.376	2.618	2.075	2.856	3.267	3.507
NITRIC OXIDE (NO), PPMV	17.900	22.300	27.500	36.600	74.300	94.250	106.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	18.749	3.857	2.478	1.038	.128	.074	.069
CARBON MONOXIDE (CO)	29.553	21.259	17.961	11.078	3.113	1.616	1.459
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.412	3.558	3.736	8.637	9.393	9.833	10.217
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.681	.343	.237	.219	.034	.024	.024
CARBON MONOXIDE (CO)	2.423	1.892	1.726	2.337	.890	.533	.511
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.280	.317	.359	1.822	2.686	3.240	3.576
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.36	99.16	99.36	99.65	99.92	99.96	99.96
F/A (EMISSIONS,CALC)	.0102	.0115	.0126	.0180	.0136	.0155	.0166

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PWA LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE 11-8-75 1
MODEL NO.: TPE331-5-251M S/NO: P94881 ENGINE TYPE(CLASS): TURBOPROP CALC ID: X TEST NO: 18
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.000	.700	33.000
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.900	635.400	706.000	
HP-HR	4.118	11.176	14.125	21.180	8.235	63.349
FUEL FLOW, LB/HR	82.882	82.882	269.822	338.294	358.586	
FUEL MASS, LB	9.976	29.993	19.787	13.762	2.921	67.989
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	10.617	10.617	1.161	.811	.879	5.829
RATE, LB HC/HR	.872	.872	.244	.884	.928	.710
MASS, LB HC	.182	.276	.818	.888	.889	.396
MASS, PERCENT OF TOTAL CYCLE	25.7	69.6	4.6	.0	.1	100.0
CYC.E, LB HC/1000 HORSEPOWER-HR PER CYCLE						6.237
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	29.413	29.413	11.177	1.578	1.387	18.392
RATE, LB CO/HR	2.414	2.414	2.365	.519	.486	2.235
MASS, LB CO	.282	.765	.176	.822	.884	1.248
MASS, PERCENT OF TOTAL CYCLE	22.6	61.3	14.1	1.7	.3	100.0
CYC.E, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.637
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.414	3.414	8.881	9.849	10.228	6.218
RATE, LB NOX/HR	.288	.288	1.889	2.253	3.585	.756
MASS, LB NOX	.033	.089	.135	.186	.838	.422
MASS, PERCENT OF TOTAL CYCLE	7.7	21.8	32.1	32.1	7.1	100.0
CYC.E, LB NOX/1000 HORSEPOWER-HR PER CYCLE						6.645

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.6
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	29.4	42.2
HC (IDLE)	6.3	8.2
NOX (TAKEOFF)	10.2	34.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869982-4 FUEL= AV. KERO. TEST NO.= 13
BAT TMP= 78D. BA EGT,F= 1058. BAT SPD= 41738. DEW PT,F= 91. AIR NUM= 78.88 SPEC NUM= .887588
FUEL H/C= 1.9288 STOI F/A= .066822 C M F= 18478. S AM T,F= 388.8 FLO,L/H= 14.168 SL TIM,S= 6.5888

DATA POINT NUMBER	267	268	269	270	271	272	273	
PERCENT MAX. CORRECTED POWER	5.8	7.6	18.8	38.2	69.8	89.8	100.1	
CORRECTED SHAFT HP	35.1	53.8	78.5	213.3	493.9	634.2	787.8	
MEASURED SHAFT HP	26.7	41.8	63.8	182.8	376.9	484.9	548.5	
SHAFT SPEED, N1, RPM	27578.8	27548.8	27548.8	41738.8	41738.8	41738.8	41738.8	
COMPRESSOR INLET TEMP.,DEG.F	99.8	97.8	99.8	88.8	88.8	88.8	88.8	
COMPRESSOR DSCHG. PRES.,PSIA	35.5	75.8	35.4	188.3	112.8	115.4	116.7	
COMPRESSOR DSCHG. TEMP,DEG F	315.8	317.8	321.8	658.8	656.8	663.8	666.8	
TURB INTERSTAGE TEMP.. DEG.F	915.8	998.8	1873.8	1875.8	1335.8	1485.8	1523.8	
CORR DELMTH FLOW, LB/SEC	2.68	2.68	2.64	7.78	7.62	7.63	7.63	
FA RATIO BASED ON DELLMTH,	.8113	.8128	.8132	.8188	.8137	.8157	.8167	
MEASURED FUEL FLOW, LB/HR	82.8	89.8	98.8	211.8	286.8	329.5	358.8	
FA RATIO CALC. FROM EMISSION	.8182	.8115	.8126	.8188	.8138	.8155	.8166	
EQUIVALENCE RATIO	.188	.168	.185	.146	.195	.227	.244	
LOADING W/P**N/S/E(T/540)	.395	.483	.393	.891	.851	.876	.874	
COMB EFFIC FROM EMISSIONS	99.362	99.162	99.363	99.648	99.916	99.956	99.968	
SUMMARY OF REDUCED EMISSION DATA								
CARBON DIOXIDE								
EQUIVALENT BY VOLUME, WET	2.89	2.38	2.62	2.87	2.86	3.27	3.51	
LB. CO2 PER LB. OF FUEL	3.88	3.11	3.12	3.18	3.15	3.15	3.15	
WEIGHT FLOW, LB./HR.	292.4	276.8	299.4	661.2	988.6	1038.4	1183.1	
CARBON MONOXIDE								
PPM BY VOLUME, WET	315.9	295.2	287.2	115.2	44.4	26.3	25.5	
LB. PER 1888 LB. OF FUEL	29.553	21.299	17.961	11.876	3.113	1.616	1.459	
WEIGHT FLOW, LB./HR.	2.423	1.892	1.726	2.337	.898	.533	.511	
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4								
PPM BY VOLUME, WET	281.8	81.8	57.8	18.9	3.8	2.1	2.1	
LB. PER 1888 LB. OF FUEL	18.7c9	3.657	2.478	1.838	.128	.874	.869	
WEIGHT FLOW, LB./HR.	.881	.343	.237	.219	.834	.824	.824	
RATIO LB HC/LB CO	.3637	.1814	.1376	.8937	.8386	.8454	.8473	
NITRIC OXIDE (NO) - WEIGHTS AS NO2								
PPM BY VOLUME, WET	17.9	22.3	27.5	36.6	7c.8	94.2	186.3	
LB. PER 1888 LB. OF FUEL	2.791	3.851	3.c25	5.779	8.529	9.585	9.582	
WEIGHT FLOW, LB./HR.	.226	.272	.329	1.219	2.439	3.132	3.494	
NITROGEN DIOXIDE (NO2)								
PPM BY VOLUME, WET	4.3	3.7	2.5	18.1	7.5	3.3	2.5	
LB. PER 1888 LB. OF FUEL	.661	.586	.311	2.858	.864	.328	.235	
WEIGHT FLOW, LB./HR.	.894	.845	.838	.683	.247	.188	.882	
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2								
PPM BY VOLUME, WET	22.2	26.8	38.8	94.7	81.5	97.5	188.7	
LB. PER 1888 LB. OF FUEL	3.412	3.598	3.736	8.637	9.393	9.833	18.217	
WEIGHT FLOW, LB./HR.	.298	.317	.359	1.822	2.686	3.248	3.576	
SMOKE MEASUREMENT DATA								
CORRECTED WEIGHT FLOW	.88786	.88785	.88784	.88711	.88711	.88718	.88789	
SMOKE NUMBER	3.58	2.48	1.28	4.78	8.28	8.28	4.78	
CORRECTED WEIGHT FLOW	.82119	.82115	.82111	.8212e	.82134	.82138	.82126	
SMOKE NUMBER	4.78	4.78	4.78	9.98	11.88	11.88	18.88	
CORRECTED WEIGHT FLOW	.83531	.83525	.83518	.83556	.83556	.83558	.83543	
SMOKE NUMBER	8.28	5.98	4.78	11.28	14.58	17.18	14.18	
CORRECTED WEIGHT FLOW	.84944	.84934	.84925	.84979	.84979	.84969	.84968	
SMOKE NUMBER	9.48	9.98	8.58	14.18	21.28	28.88	17.68	
SMOKE NUMBER AT MA=8.823	6.58	4.78	4.28	9.88	14.58	14.38	11.78	

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.811).

AIRESEARCH EMISSION TEST SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PWA (ACCT INSTA DESCRIP : FLD REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P3-801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.9 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 14
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18478. BTU/LB ADDITIVES: NONE

EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1972 **

HYDROCARBONS (CH AS CH4)	3.114	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	15.491	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.848	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.9	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

ENGINE DESCRIPTION

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869882-4 SUR/VOL: 1.269 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFG.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

OPERATIONAL TEST DATA SUMMARY

GASEOUS EMISSION TEST NO.: 1 DATE: 11-6-75 TIME: BAR PRESS.: 29.900 IN. HGA.
AMBIENT AIR TEMP.: 99.00 DEG. F RELATIVE HUMIDITY: 78.00 PERCENT SPECIFIC HUMIDITY: .887500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 390.83 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 98.00 FT.

COMPUTED EMISSIONS

TEST CONDITION	274	275	276	277	278	279	280
ACTUA. POWER SETTING, HORSEPOWER	31.6	69.7	62.0	179.3	431.8	554.1	618.5
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.15	7.45	10.11	29.22	70.23	90.39	99.69
N1 SPEED, RPM	27510.00	27568.00	27528.00	27303.00	27710.00	27708.00	27786.00
FUEL FLOW (MEAS.) LB./HR.	96.0	185.0	116.0	234.0	721.0	969.0	958.0
CORR. (ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.7	7.8	7.8	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	68.00	68.00	59.00	68.00	68.00	59.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	12.76	12.76	12.76	12.76	12.76	12.76	12.76
COMPRESSOR DISCHARGE AIR TOTA. PRESS., PSIA	43.71	44.86	44.35	121.32	129.91	133.25	133.45
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	326.00	322.00	323.00	441.00	652.00	657.00	666.00
TURBINE INLETSTAGE GAS TOTAL TEMP., DEG F	914.0	964.0	1033.0	1075.0	1274.0	1371.0	1421.0
EXHAUST GAS STATIC PRESSURE, PSIA	12.75	12.75	12.74	12.63	12.64	12.60	12.60
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	78.900	54.630	33.000	15.000	2.400	1.950	2.700
CARBON MONOXIDE (CO), PPMV	266.782	188.695	172.795	92.579	32.033	18.233	18.636
TOTAL OXIDES OF NITROGEN (NOX), PPMV	43.500	76.900	71.506	52.000	65.000	103.750	105.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.188	2.267	2.524	1.959	2.725	3.140	3.250
NITRIC OXIDE (NO), PPMV	19.600	23.200	27.500	46.000	78.500	97.500	102.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	9.237	2.736	1.500	.874	.101	.066	.092
CARBON MONOXIDE (CO)	19.478	16.614	13.632	8.422	2.357	1.162	1.113
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.427	3.871	4.862	8.845	10.273	10.862	10.378
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.487	.287	.173	.285	.832	.824	.824
CARBON MONOXIDE (CO)	1.865	1.744	1.901	1.971	.757	.429	.434
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.348	.406	.474	2.078	3.298	4.888	4.847
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.17	99.37	99.55	99.73	99.94	99.97	99.97
F/A (EMISSIONS.CALC)	.0182	.0189	.0171	.0094	.0138	.0149	.0159

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EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHA LACCO INSTR DESCRIP : FED REG V38 N136 CALC DATE 11-6-75
MODEL NO.: TPE331-9-2014 S/N: P8-001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 14
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.500	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	95.402	95.402	239.507	367.260	309.290	
FUEL MASS, LB	11.130	30.211	17.963	15.383	3.244	77.851
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.353	4.353	.947	.045	.061	2.541
RATE, LB HC/HR	.415	.415	.227	.016	.024	.354
MASS, LB HC	.048	.131	.017	.001	.000	.198
MASS, PERCENT OF TOTAL CYCLE	24.5	66.5	8.6	.3	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.114
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	19.617	19.617	8.536	1.093	.992	12.643
RATE, LB CO/HR	1.872	1.872	2.044	.402	.386	1.763
MASS, LB CO	.218	.593	.153	.017	.003	.984
MASS, PERCENT OF TOTAL CYCLE	22.2	60.2	15.6	1.7	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						15.491
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.603	3.603	9.051	10.834	10.292	6.560
RATE, LB NOX/HR	.344	.344	2.168	3.979	4.007	.915
MASS, LB NOX	.040	.109	.163	.166	.033	.511
MASS, PERCENT OF TOTAL CYCLE	7.9	21.3	31.8	32.5	6.5	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.038

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS F2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	19.6	37.0
HC (IDLE)	4.4	7.1
NOX (TAKEOFF)	10.3	26.3

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P34001 COMB P/N= 869882-4 FUEL= AV. KERO. TEST NO.= 14
RAT SHP= 706. AA CNT.F= 1650. RAT SPD= 41730. DEW PT.F= 51. RE. HUM= 78.88 SPEC HUM= .007588
FUEL H/C= 1.9260 STOI F/A= .066822 L H V= 18478. S LN T.F= 800.8 FLO..#HR= 14.160 SL TIM.S= 6.5888

DATA POINT NUMBER	274	275	276	277	278	279	280
PERCENT MAX. CORRECTED POWER	5.2	7.4	10.1	29.2	70.2	90.4	99.7
CORRECTED SHAFT HP	36.4	52.6	71.3	206.3	495.8	638.1	703.7
MEASURED SHAFT HP	31.6	49.7	62.8	179.3	431.8	554.1	610.5
SHAFT SPEED, N1, RPM	27510.0	27580.0	27630.0	41740.0	41710.0	41710.0	41700.0
COMPRESSOR INLET TEMP.,DEG.F	60.0	60.0	59.0	60.0	60.0	59.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	43.7	44.1	44.4	121.3	129.9	133.3	133.4
COMPRESSOR DSCHG. TEMP,DEG F	326.0	322.0	323.0	641.0	652.0	657.0	660.0
TURB INTERSTAGE TEMP., DEG.F	914.0	964.0	1033.0	1275.0	1274.0	1371.0	1421.0
CORR BELMTH FLOW, LB/SEC	2.90	2.92	2.81	7.78	7.79	7.78	7.67
FA RATIO BASED ON BELLMTH.	.0186	.0115	.0132	.0097	.0133	.0152	.0163
MEASURED FUEL FLOW, LB/HR	96.0	105.0	116.0	234.0	321.0	369.0	390.0
FA RATIO CALC. FROM EMISSION	.0182	.0109	.0121	.0094	.0138	.0149	.0159
EQUIVALENCE RATIO	.149	.168	.178	.138	.190	.219	.234
LOADING #/P**N/V/E(T/518)	.335	.335	.319	.883	.873	.869	.868
COMB EFFIC FROM EMISSIONS	99.171	99.369	99.549	99.725	99.936	99.967	99.966

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.11	2.27	2.52	1.96	2.72	3.19	3.36
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	298.7	327.6	362.9	734.4	1011.2	1163.1	1229.3
CARBON MONOXIDE							
PPM BY VOLUME, WET	206.6	183.7	172.6	82.6	32.0	19.2	18.6
LB. PER 1000 LB. OF FUEL	19.428	16.614	13.432	6.422	2.357	1.162	1.113
WEIGHT FLOW, LB./HR.	1.865	1.744	1.581	1.371	.757	.429	.434
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	78.9	54.6	33.0	15.8	2.4	1.8	2.7
LB. PER 1000 LB. OF FUEL	4.237	2.734	1.488	.674	.181	.066	.092
WEIGHT FLOW, LB./HR.	.407	.287	.173	.265	.032	.024	.036
RATIO LB HC/LB CO	.2181	.1646	.1092	.1038	.0428	.0564	.0820
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	18.8	23.2	27.9	60.2	78.5	97.5	102.5
LB. PER 1000 LB. OF FUEL	2.981	3.338	3.564	6.781	9.487	10.287	10.059
WEIGHT FLOW, LB./HR.	.279	.351	.413	1.568	3.045	3.766	3.923
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.7	3.7	4.8	12.8	6.5	6.8	3.2
LB. PER 1000 LB. OF FUEL	.725	.532	.518	2.146	.786	.694	.319
WEIGHT FLOW, LB./HR.	.070	.056	.060	.502	.252	.241	.124
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.5	26.9	31.5	92.8	85.0	103.7	105.7
LB. PER 1000 LB. OF FUEL	3.627	3.871	4.082	8.845	10.273	10.982	10.378
WEIGHT FLOW, LB./HR.	.348	.406	.474	2.070	3.298	4.008	4.047
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00698	.00698	.00696	.00705	.00717	.00717	.00717
SMOKE NUMBER	4.78	2.43	1.28	4.78	11.48	9.48	9.28
CORRECTED WEIGHT FLOW	.02693	.02693	.02869	.02115	.02151	.02150	.02150
SMOKE NUMBER	4.78	9.98	4.78	9.48	15.38	14.18	11.88
CORRECTED WEIGHT FLOW	.03489	.03489	.03482	.03525	.03991	.03583	.03583
SMOKE NUMBER	5.29	7.19	6.29	10.68	20.88	18.98	17.68
CORRECTED WEIGHT FLOW	.04884	.04884	.04875	.04935	.05027	.05017	.05017
SMOKE NUMBER	11.98	8.88	8.28	12.98	24.78	24.78	23.58
SMOKE NUMBER AT WA=0.823	7.48	6.18	5.79	9.58	17.98	16.88	15.38

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

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**********  AIRESEARCH EMISSION TEST SUMMARY  **********

ENG MFG : AIRESEARCH          TEST FACIL : PHX LACLI   INSTR DESCRIP : FLD REG V38 N136          CALC DATE :11-6-75
MODEL NO.:    TPE331-5-251M      S/N:   P54001          ENGINE TYPE(CLASS):  TURBOPROP          CALC ID:  2
RATED POWER:    726.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS                                  TEST NO:  14
FUEL: ASTM D1655-73            ATOMIC H/C RATIO:  1.926      LHV: 18478. BTU/LB      ADDITIVES:  NONE

********  EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87  17 JULY 1973  ********
                    HYDROCARBONS (CH AS CH4)          3.885 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
                    CARBON MONOXIDE (CO)             10.401 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
                    OXIDES OF NITROGEN (NOX AS NO2)   7.932 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
                    SMOKE                            19.6  SMOKE NUMBER, MAXIMUM AT  CRUISE    MODE,  78 PERCENT RATED POWER
TAXI-IDLE SETTING: 5.0      PERCENT RATED TAKEOFF POWER AT 65.      PERCENT RATED TAKEOFF N1 RPM

**********  ENGINE DESCRIPTION  **********
COMB TYPE: REVERSE FLOW ANNULAR          P/N:   969882-4          SUR/VC.: 1.260  FUEL INJ TYPE:  STAGED SIMPLEX
ENGINE TOTAL SERVICE:   0.0       HR    TIME SINCE ENGINE OVERHAUL:  0.0       HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFG.:                          MODEL NO.:
                          USER:                      ENGINE INSTALLATION POSITION:
**********  OPERATIONAL TEST DATA SUMMARY  **********
GASEOUS EMISSION TEST NO.:  1-          DATE: 11-6-75          TIME:                          BARO PRESS.:  25.980 IN. HGA.
AMBIENT AIR TEMP.:  59.00 DEG. F        RELATIVE HUMIDITY:  70.00 PERCENT      SPECIFIC HUMIDITY:  .007588 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY    HYDROCARBONS (HC): 0.0   PPMC     CARBON MONOXIDE (CO): 0.0   PPMV    OXIDES OF NITROGEN (NOX): 0.0   PPMV
SAMPLE LINE *** TEMP.:  300.62 DEG. F.      FLOWRATE:  14.16 LITERS/MIN.      TRANSPORT TIME:  6.50 SEC.      LENGTH:  50.00 FT.

**********  COMPUTED EMISSIONS  **********
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TEST CONDITION	281	282	283	284	285	286	287
ACTUAL POWER SETTING, HORSEPOWER	38.0	46.6	61.9	184.3	427.8	551.1	669.9
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.98	7.01	10.10	30.13	69.85	89.90	99.38
N1 SPEED, RPM	27566.86	27536.86	27528.86	41740.86	41728.86	41738.86	41738.86
FUEL FLOW (MEAS.) LB./HR.	96.0	106.0	115.0	230.0	325.0	373.0	397.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.8	2.9	2.6	7.7	7.7	7.6	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	59.00	59.00	57.00	58.00	58.00	61.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	12.76	12.76	12.76	12.76	12.76	12.76	12.76
COMPRESSOR DISCHARGE AIR TOTA. PRESS., PSIA	43.47	43.86	44.28	119.84	128.59	132.22	133.45
COMPRESSOR DISCHARGE AIR TOTA. TEMP., DEG F	320.88	320.88	321.88	642.88	652.88	658.88	661.88
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	917.0	972.0	1037.0	1123.0	1135.0	1458.0	1511.0
EXHAUST GAS STATIC PRESSURE, PSIA	12.75	12.75	12.74	12.62	12.64	12.68	12.69
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	91.000	52.500	33.000	12.000	2.400	1.000	1.000
CARBON MONOXIDE (CO), PPMV	219.944	165.179	175.906	88.828	37.775	21.865	19.442
TOTAL OXIDES OF NITROGEN (NOX), PPMV	22.000	27.300	32.000	59.500	82.500	103.250	110.000
CARBON DIOXIDE (CO2), PERCENT BY VO..	2.047	2.277	2.514	2.851	2.765	3.207	3.457
NITRIC OXIDE (NO), PPMV	16.000	22.000	27.500	41.000	77.500	99.500	106.750
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.675	2.617	1.494	.658	.099	.064	.060
CARBON MONOXIDE (CO)	21.299	17.022	13.937	7.736	2.719	1.368	1.128
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.556	3.911	4.163	8.649	9.759	10.689	10.486
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.448	.277	.172	.158	.032	.024	.024
CARBON MONOXIDE (CO)	2.041	1.804	1.605	1.848	.884	.510	.448
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.341	.415	.479	2.066	3.178	3.987	4.163
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.11	99.37	99.54	99.76	99.93	99.96	99.97
F/A (EMISSIONS,CALC)	.0099	.0110	.0121	.0098	.0138	.0192	.0164

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH   TEST FACIL : PHX LACCI   INSTR DESCRIP : FED REG V38 N136   CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M   S/N: P04081   ENGINE TYPE(CLASS): TURBOPROP   CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS   TEST NO: 14
FUEL: ASTM D1655-73   ATOMIC H/C RATIO: 1.924   LHV: 18478. BTU/LB   ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.000
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	96.411	96.411	235.055	373.102	395.218	
FUEL MASS, LB	11.248	30.530	17.629	15.546	3.293	78.247
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.387	4.387	.661	.065	.021	2.505
RATE, LB HC/HR	.423	.423	.155	.024	.008	.351
MASS, LB HC	.049	.134	.012	.001	.000	.196
MASS, PERCENT OF TOTAL CYCLE	25.2	68.3	5.9	.5	.0	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.085
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.075	21.075	7.787	1.370	.924	13.310
RATE, LB CO/HR	2.032	2.032	1.830	.511	.365	1.866
MASS, LB CO	.237	.643	.137	.021	.003	1.042
MASS, PERCENT OF TOTAL CYCLE	22.7	61.7	13.2	2.0	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						16.401
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.576	3.576	8.822	10.610	10.366	6.441
RATE, LB NOX/HR	.345	.345	2.074	3.959	4.097	.903
MASS, LB NOX	.040	.109	.156	.165	.034	.504
MASS, PERCENT OF TOTAL CYCLE	8.0	21.7	30.9	32.7	6.8	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						7.932

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	21.1	36.9
HC (IDLE)	4.6	7.1
NOX (TAKEOFF)	10.4	28.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY. CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED. (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES. NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

47COT4

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04881 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 14
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007588
FUEL H/C= 1.9288 STOI F/A= .06922 L H V= 18478. S LN T,F= 388.8 FLO.,/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	281	282	283	284	285	286	287
PERCENT MAX. CORRECTED POWER	4.9	7.6	10.1	30.1	69.8	90.8	99.3
CORRECTED SHAFT HP	34.6	53.7	71.3	212.7	493.1	635.3	701.8
MEASURED SHAFT HP	36.0	46.6	61.3	184.3	427.8	551.1	609.9
SHAFT SPEED, N1, RPM	27560.0	27530.0	27520.0	41740.0	41720.0	41730.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	59.0	59.0	59.0	57.8	58.0	58.0	61.8
COMPRESSOR DSCHG. PRES.,PSIA	43.5	43.9	44.2	114.8	128.6	132.2	133.4
COMPRESSOR DSCHG. TEMP,DEG F	320.0	320.0	321.0	642.0	652.0	658.0	661.0
TURB INTERSTAGE TEMP., DEG.F	917.0	972.0	1037.0	1123.0	1335.0	1458.0	1511.0
CORR SELMTH FLOW, LB/SEC	2.99	2.98	2.79	7.69	7.72	7.75	7.69
FA RATIO BASED ON SELLMTH.	.0103	.0117	.0132	.0098	.0134	.0154	.0165
MEASURED FUEL FLOW, LB/HR	96.0	106.0	119.0	236.0	325.0	373.0	397.0
FA RATIO CALC. FROM EMISSION	.0099	.0119	.0121	.0098	.0133	.0152	.0164
EQUIVALENCE RATIO	.145	.161	.177	.144	.194	.223	.248
LOADING W/F**N/V/E(T/540)	.353	.338	.319	.085	.074	.078	.068
COMB EFFIC FROM EMISSIONS	99.107	99.378	99.541	99.753	99.927	99.962	99.968

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.85	2.28	2.51	2.85	2.78	3.21	3.46
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	299.4	330.7	359.7	741.0	1023.6	1175.6	1251.4
CARBON MONOXIDE							
PPM BY VOLUME, WET	219.9	195.2	176.8	88.0	37.8	21.9	19.4
LB. PER 1000 LB. OF FUEL	21.259	17.022	13.937	7.796	2.719	1.368	1.128
WEIGHT FLOW, LB./HR.	2.041	1.804	1.603	1.540	.884	.518	.448
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	81.0	92.5	33.0	12.0	2.4	1.8	1.8
LB. PER 1000 LB. OF FUEL	4.475	2.617	1.494	.668	.899	.064	.068
WEIGHT FLOW, LB./HR.	.430	.277	.172	.158	.092	.024	.024
RATIO LB HC/LB CO	.2105	.1537	.1072	.0857	.0363	.0471	.0529
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	16.8	22.8	27.5	41.0	77.5	99.5	108.7
LB. PER 1000 LB. OF FUEL	2.667	3.266	3.578	6.561	9.164	10.223	10.367
WEIGHT FLOW, LB./HR.	.256	.346	.411	1.548	2.978	3.813	4.116
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	5.6	4.5	4.5	14.3	5.8	3.8	1.3
LB. PER 1000 LB. OF FUEL	.889	.645	.585	2.288	.591	.385	.119
WEIGHT FLOW, LB./HR.	.085	.068	.067	.540	.192	.144	.047
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	22.4	27.3	32.0	55.3	82.5	103.2	110.0
LB. PER 1000 LB. OF FUEL	3.556	3.911	4.163	8.849	9.755	10.689	10.486
WEIGHT FLOW, LB./HR.	.341	.415	.479	2.088	3.178	3.957	4.163
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00696	.00698	.00696	.00694	.00716	.00712	.00707
SMOKE NUMBER	3.50	2.40	2.40	5.90	5.90	7.10	6.70
CORRECTED WEIGHT FLOW	.02089	.02093	.02089	.02083	.02148	.02135	.02122
SMOKE NUMBER	4.70	4.70	4.70	10.00	14.10	11.80	11.80
CORRECTED WEIGHT FLOW	.03482	.03489	.03482	.03472	.03579	.03564	.03544
SMOKE NUMBER	7.60	7.10	6.50	12.90	18.80	17.60	17.60
CORRECTED WEIGHT FLOW	.04875	.04884	.04874	.04860	.05020	.04990	.04952
SMOKE NUMBER	9.40	9.40	7.60	18.20	23.50	23.50	20.00
SMOKE NUMBER AT WA=0.023	6.40	6.00	5.40	12.00	15.60	15.10	13.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAC02 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P8-801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 786.8 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 14
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.885	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.477	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.246	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	16.0	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 14 DATE: 11-6-75 TIME: BARO PRESS.: 25.980 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007508 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 388.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	288	289	290	291	292	293	294
ACTUAL POWER SETTING, HORSEPOWER	31.1	46.7	62.6	185.6	433.8	546.9	689.0
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.87	7.61	10.21	30.33	70.83	89.21	99.53
N1 SPEED, RPM	27500.00	27500.00	27500.00	41740.00	41740.00	41720.00	41770.00
FUEL FLOW (MEAS.) LB./HR.	96.0	108.0	119.0	236.0	322.0	372.0	393.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.9	2.8	7.7	7.8	7.7	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	59.00	59.00	58.00	57.00	58.00	59.00	57.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	12.76	12.76	12.76	12.76	12.76	12.76	12.76
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	43.37	44.11	44.70	119.64	128.54	132.51	133.10
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	319.00	326.00	322.00	643.00	651.00	658.00	659.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	902.0	974.0	1032.0	1115.0	1352.0	1447.0	1507.0
EXHAUST GAS STATIC PRESSURE, PSIA	12.75	12.75	12.75	12.63	12.63	12.66	12.68
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	75.000	47.100	31.000	13.500	1.500	.600	.900
CARBON MONOXIDE (CO), PPMV	216.636	191.833	174.153	88.029	35.318	22.278	11.617
TOTAL OXIDES OF NITROGEN (NOX), PPMV	23.900	28.500	32.200	56.100	83.250	105.500	113.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.019	2.287	2.488	2.878	2.752	3.237	3.419
NITRIC OXIDE (NO), PPMV	19.100	24.200	27.600	43.700	74.250	102.250	112.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.202	2.339	1.455	.745	.062	.021	.030
CARBON MONOXIDE (CO)	21.235	16.537	13.937	7.725	2.572	1.390	.693
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.848	4.867	4.233	9.213	9.962	10.740	10.917
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.403	.253	.173	.176	.020	.008	.012
CARBON MONOXIDE (CO)	2.039	1.792	1.658	1.823	.828	.513	.273
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.369	.439	.504	2.174	3.208	3.995	4.290
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.13	99.48	99.54	99.75	99.93	99.97	99.98
F/A (EMISSIONS,CALC)	.0098	.0110	.0119	.0099	.0131	.0154	.0162

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-6-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 14
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	48.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.500	635.400	786.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	95.613	95.613	233.666	375.895	390.994	
FUEL MASS, LB	11.155	30.278	17.525	15.662	3.258	77.878
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.279	4.279	.763	.883	.865	2.452
RATE, LB HC/HR	.489	.489	.178	.881	.825	.342
MASS, LB HC	.848	.138	.813	.888	.888	.191
MASS, PERCENT OF TOTAL CYCLE	25.8	67.9	7.8	.8	.1	188.8
CYCLE, LB HC/1888 HORSEPOWER-HR PER CYCLE						3.885
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1888 LB FUEL	21.418	21.418	7.988	1.316	.677	13.443
RATE, LB CO/HR	2.848	2.848	1.823	.495	.265	1.875
MASS, LB CO	.239	.648	.137	.821	.882	1.847
MASS, PERCENT OF TOTAL CYCLE	22.8	61.9	13.1	2.8	.2	188.8
CYCLE, LB CO/1888 HORSEPOWER-HR PER CYCLE						16.477
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1888 LB FUEL	3.838	3.838	9.129	18.821	18.842	6.726
RATE, LB NOX/HR	.367	.367	2.133	4.868	4.239	.938
MASS, LB NOX	.843	.116	.168	.169	.835	.524
MASS, PERCENT OF TOTAL CYCLE	8.2	22.2	38.5	32.4	6.7	188.8
CYCLE, LB NOX/1888 HORSEPOWER-HR PER CYCLE						8.244

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1888 HORSEPOWER-HR-CYCLE
CO	26.8
HC	.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1888 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	21.4	37.2
HC (IDLE)	4.3	7.2
NOX (TAKEOFF)	18.8	26.5

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

**** AIRESEARCH EMISSION TEST SUMMARY ****

ENGINE= TPE331-5-251M S/N= P8-801 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 14
RAT SHP= 786. RA EGT,F= 1058. RAT SPD= 41738. DEW PT,F= 51. RE. HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18478. S LA T,F= 300.0 FUEL/HR= 14.168 SL TIM,S= 6.5000

DATA POINT NUMBER	288	289	290	291	292	293	294
PERCENT MAX. CORRECTED POWER	5.1	7.6	10.2	30.3	70.0	89.2	99.5
CORRECTED SHAFT HP	35.9	53.8	72.1	214.1	500.1	629.9	702.7
MEASURED SHAFT HP	31.1	50.7	68.6	185.6	483.8	566.9	609.8
SHAFT SPEED, N1, RPM	27590.0	27560.0	27580.0	41740.0	41740.0	41720.0	41770.0
COMPRESSOR INLET TEMP.,DEG.F.	59.0	59.0	58.0	57.0	58.0	59.0	57.0
COMPRESSOR DSCHG. PRES.,PSIA	43.4	44.1	44.7	119.8	128.5	132.5	133.1
COMPRESSOR DSCHG. TEMP,DEG F	319.0	320.0	322.0	643.0	651.0	655.0	659.0
TURB INTERSTAGE TEMP., DEG.F	902.0	974.0	1032.0	1115.0	1352.0	1447.0	1507.0
CORR BELLMTH FLOW, LB/SEC	2.34	2.93	2.84	7.68	7.76	7.72	7.73
FA RATIO BASED ON BELLMTH.	.0104	.0118	.0134	.0098	.0132	.0154	.0162
MEASURED FUEL FLOW, LB/HR	96.0	108.0	119.0	236.0	322.0	372.0	393.0
FA RATIO CALC. FROM EMISSION	.0098	.0110	.0119	.0093	.0131	.0154	.0162
EQUIVALENCE RATIO	.143	.161	.175	.145	.192	.225	.238
LOADING W/P**N/V/E(T/540)	.358	.338	.319	.085	.075	.069	.069
COMB EFFIC FROM EMISSIONS	99.132	99.184	99.343	99.753	99.934	99.966	99.981
**** SUMMARY OF REDUCED EMISSION DATA ****							
CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.02	2.29	2.49	2.87	2.75	3.24	3.42
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	298.5	337.1	372.3	741.0	1014.3	1172.5	1239.1
CARBON MONOXIDE							
PPM BY VOLUME, WET	216.6	191.8	174.2	83.8	35.3	22.3	11.8
LB. PER 1000 LB. OF FUEL	21.235	16.597	13.937	7.725	2.572	1.380	.693
WEIGHT FLOW, LB./HR.	2.039	1.792	1.658	1.823	.828	.513	.273
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	75.3	47.1	31.8	13.3	1.5	.6	.9
LB. PER 1000 LB. OF FUEL	4.202	2.339	1.456	.745	.062	.021	.030
WEIGHT FLOW, LB./HR.	.403	.253	.173	.176	.020	.008	.012
RATIO LB HC/LB CO	.1979	.1409	.1044	.0964	.0243	.0154	.0435
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	19.1	24.2	27.6	43.7	74.2	102.2	112.5
LB. PER 1000 LB. OF FUEL	3.875	3.454	3.628	6.429	8.885	10.489	10.844
WEIGHT FLOW, LB./HR.	.295	.373	.432	1.635	2.861	3.872	4.262
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.8	4.3	4.6	14.4	9.0	3.3	.7
LB. PER 1000 LB. OF FUEL	.773	.614	.605	2.283	1.077	.331	.072
WEIGHT FLOW, LB./HR.	.074	.066	.072	.539	.347	.123	.028
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.9	28.5	32.2	58.1	83.2	105.5	113.2
LB. PER 1000 LB. OF FUEL	3.848	4.067	4.233	9.213	9.962	10.740	10.917
WEIGHT FLOW, LB./HR.	.369	.439	.504	2.174	3.208	3.995	4.290
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.03696	.03696	.03696	.03695	.03708	.03710	.03713
SMOKE NUMBER	.60	2.40	2.40	4.70	7.10	5.90	5.90
CORRECTED WEIGHT FLOW	.02088	.02088	.02088	.02086	.02123	.02131	.02138
SMOKE NUMBER	7.10	5.90	5.30	8.80	14.10	11.80	9.40
CORRECTED WEIGHT FLOW	.03481	.03481	.03481	.03477	.03538	.03551	.03563
SMOKE NUMBER	5.28	7.10	5.90	12.40	18.80	17.60	15.30
CORRECTED WEIGHT FLOW	.04873	.04873	.04873	.04868	.04953	.04972	.04989
SMOKE NUMBER	10.60	9.40	7.10	16.20	23.50	21.20	20.00
SMOKE NUMBER AT WA=0.823	6.88	6.38	5.20	11.20	16.00	14.20	12.70

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

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********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 15
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.770	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.454	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.060	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.8	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869862-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 15 DATE: 11-3-75 TIME: BARO PRESS.: 28.960 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .087500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	295	296	297	298	299	300	301
ACTUAL POWER SETTING, HORSEPOWER	34.7	50.3	70.6	202.0	475.6	611.9	680.3
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.00	7.38	10.32	29.56	69.39	89.37	99.27
N1 SPEED, RPM	27570.00	27520.00	27540.00	41740.00	41750.00	41730.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	116.0	119.0	132.0	256.0	350.0	400.0	431.0
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.8	7.9	7.9	7.9	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	58.00	56.00	61.00	59.00	62.00	61.00	62.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.22	14.22	14.22	14.22	14.22	14.22	14.22
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	49.21	49.36	49.36	135.41	142.53	147.10	148.62
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	321.00	319.00	326.00	643.00	654.00	659.00	663.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	865.0	929.0	1018.0	1893.0	1300.0	1404.0	1480.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.21	14.21	14.21	14.10	14.12	14.16	14.17
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	78.000	48.000	31.500	7.800	3.900	3.300	3.300
CARBON MONOXIDE (CO), PPMV	216.636	198.114	165.129	56.650	28.249	17.826	13.416
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.000	23.400	28.000	56.000	65.250	101.000	107.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.963	2.178	2.467	1.977	2.698	3.124	3.364
NITRIC OXIDE (NO), PPMV	14.000	18.100	23.300	41.700	76.000	93.000	102.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.491	2.518	1.453	.451	.166	.121	.113
CARBON MONOXIDE (CO)	21.824	17.396	13.328	5.754	1.505	1.093	.800
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.475	3.517	3.818	9.310	10.410	10.653	10.532
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.521	.299	.192	.116	.058	.048	.048
CARBON MONOXIDE (CO)	2.532	2.070	1.759	1.484	.527	.437	.345
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.403	.419	.504	2.402	3.643	4.261	4.539
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.89	99.37	99.56	99.83	99.95	99.96	99.97
F/A (EMISSIONS,CALC)	.0095	.0105	.0116	.0095	.0128	.0148	.0168

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P04801 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 15
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	116.039	116.039	259.844	401.095	435.449	
FUEL MASS, LB	13.538	36.746	19.488	16.712	3.629	90.113
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.583	4.583	.375	.042	.299	2.658
RATE, LB HC/HR	.532	.532	.097	.017	.130	.429
MASS, LB HC	.062	.168	.007	.001	.001	.240
MASS, PERCENT OF TOTAL CYCLE	25.9	70.3	3.0	.3	.5	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.778
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.995	21.995	5.635	1.811	.941	13.717
RATE, LB CO/HR	2.552	2.552	1.464	.405	.410	2.214
MASS, LB CO	.298	.808	.118	.017	.003	1.236
MASS, PERCENT OF TOTAL CYCLE	24.1	65.4	8.9	1.4	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.454
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.476	3.476	9.448	10.728	10.336	6.389
RATE, LB NOX/HR	.403	.403	2.455	4.303	4.501	1.831
MASS, LB NOX	.047	.128	.184	.179	.038	.576
MASS, PERCENT OF TOTAL CYCLE	8.2	22.2	32.0	31.1	6.5	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.060

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	22.8	31.3
HC (IDLE)	4.6	6.8
NOX (TAKEOFF)	10.3	22.8

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

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** AIRESEARCH EMISSION TEST SUMMARY **

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-6 FUEL= AV. KERO. TEST NO.= 15
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9200 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	295	296	297	298	299	300	301
PERCENT MAX. CORRECTED POWER	5.1	7.4	10.3	29.6	69.4	89.4	99.3
CORRECTED SHAFT HP	35.9	52.1	72.8	208.7	489.9	631.0	700.9
MEASURED SHAFT HP	34.7	50.3	70.6	202.0	475.6	611.9	680.3
SHAFT SPEED, N1, RPM	27570.0	27520.0	27540.0	41740.0	41750.0	41730.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	58.0	56.0	61.0	59.0	62.0	61.0	62.0
COMPRESSOR DSCHG. PRES.,PSIA	49.2	49.4	49.4	135.4	142.5	147.1	148.8
COMPRESSOR DSCHG. TEMP,DEG F	321.0	319.0	326.0	643.0	654.0	659.0	663.0
TURB INTERSTAGE TEMP., DEG.F	865.0	929.0	1010.0	1093.0	1300.0	1404.0	1400.0
CORR BELMTH FLOW, LB/SEC	2.97	2.92	2.81	7.89	7.86	7.85	7.82
FA RATIO BASED ON BELLMTH.	.0112	.0117	.0135	.0094	.0128	.0146	.0159
MEASURED FUEL FLOW, LB/HR	116.0	119.0	132.0	258.0	350.0	400.0	431.0
FA RATIO CALC. FROM EMISSION	.0095	.0105	.0118	.0095	.0128	.0148	.0160
EQUIVALENCE RATIO	.139	.153	.174	.139	.188	.218	.234
LOADING W/P**N/V/E(T/540)	.314	.309	.292	.078	.070	.065	.063
COMB EFFIC FROM EMISSIONS	99.893	99.371	99.559	99.825	99.950	99.964	99.971

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.96	2.17	2.47	1.98	2.70	3.12	3.36
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	360.5	371.3	413.0	811.1	1102.9	1260.8	1358.7
CARBON MONOXIDE							
PPM BY VOLUME, WET	216.6	190.1	165.1	56.8	20.2	17.0	13.4
LB. PER 1000 LB. OF FUEL	21.824	17.396	13.328	5.754	1.505	1.093	.800
WEIGHT FLOW, LB./HR.	2.532	2.070	1.759	1.484	.527	.437	.345
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	75.0	40.0	31.5	7.8	3.9	3.3	3.3
LB. PER 1000 LB. OF FUEL	4.491	2.510	1.453	.451	.166	.121	.113
WEIGHT FLOW, LB./HR.	.521	.299	.192	.116	.058	.048	.048
RATIO LB HC/LB CO	.2058	.1443	.1090	.0784	.1101	.1108	.1406
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.0	18.1	23.3	41.7	76.0	93.0	102.5
LB. PER 1000 LB. OF FUEL	2.317	2.720	3.089	6.932	9.280	9.809	10.042
WEIGHT FLOW, LB./HR.	.269	.324	.408	1.789	3.240	3.924	4.328
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	7.0	5.3	5.5	14.3	9.3	8.0	5.0
LB. PER 1000 LB. OF FUEL	1.158	.797	.729	2.377	1.130	.844	.490
WEIGHT FLOW, LB./HR.	.134	.095	.096	.613	.395	.338	.211
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.0	23.4	28.8	56.0	85.2	101.0	107.5
LB. PER 1000 LB. OF FUEL	3.475	3.517	3.818	9.310	10.410	10.653	10.532
WEIGHT FLOW, LB./HR.	.403	.419	.504	2.402	3.643	4.261	4.539
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00707	.00707	.00706	.00704	.00705	.00709	.00710
SMOKE NUMBER	1.20	2.30	2.30	3.50	7.00	4.70	7.00
CORRECTED WEIGHT FLOW	.02121	.02121	.02117	.02112	.02115	.02126	.02130
SMOKE NUMBER	7.00	3.50	3.50	10.50	12.00	11.60	11.60
CORRECTED WEIGHT FLOW	.03535	.03535	.03528	.03519	.03531	.03544	.03557
SMOKE NUMBER	7.00	4.70	4.70	16.30	19.80	16.30	16.30
CORRECTED WEIGHT FLOW	.04949	.04949	.04940	.04918	.04944	.04962	.04980
SMOKE NUMBER	8.10	5.80	7.00	18.60	23.30	20.90	18.60
SMOKE NUMBER AT WA=0.023	5.90	4.10	4.40	12.40	15.80	13.50	13.40

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 15
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.762	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.025	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	8.794	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	18.5	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 15 DATE: 11-3-75 TIME: BARO PRESS.: 28.880 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	302	303	304	305	306	307	308
ACTUAL POWER SETTING, HORSEPOWER	33.6	50.8	67.1	207.2	477.6	610.5	679.4
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.94	7.44	9.80	30.46	70.15	89.41	99.41
N1 SPEED, RPM	27520.00	27540.00	27510.00	41760.00	41770.00	41700.00	41750.00
FUEL FLOW (MEAS.) LB./HR.	116.0	116.0	130.0	260.0	352.0	402.0	425.5
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.0	2.9	2.8	7.9	7.9	7.8	7.8
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	57.00	61.00	63.00	57.00	58.00	61.00	62.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.18	14.18	14.18	14.18	14.18	14.18	14.18
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	46.87	48.87	49.56	136.05	143.42	146.37	147.84
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	319.00	324.00	325.00	639.00	651.00	657.00	661.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	875.0	943.0	1011.0	1098.0	1318.0	1389.0	1450.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.17	14.17	14.17	14.07	14.08	14.12	14.13
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	81.000	43.500	34.500	6.000	.600	.600	.600
CARBON MONOXIDE (CO), PPMV	215.693	187.820	176.420	58.941	23.890	19.846	19.442
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.000	25.000	27.800	53.800	85.000	102.500	114.500
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.000	2.218	2.447	2.000	2.698	3.177	3.426
NITRIC OXIDE (NO), PPMV	14.700	19.100	22.500	41.000	77.500	96.000	106.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.579	2.227	1.604	.343	.025	.022	.020
CARBON MONOXIDE (CO)	21.331	16.821	14.349	5.896	1.776	1.253	1.139
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.411	3.678	3.714	8.841	10.379	10.631	11.015
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.531	.258	.289	.089	.009	.009	.009
CARBON MONOXIDE (CO)	2.474	1.951	1.865	1.533	.625	.584	.484
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.396	.427	.483	2.299	3.653	4.274	4.687
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.10	99.41	99.52	99.83	99.96	99.97	99.97
F/A (EMISSIONS,CALC)	.0097	.0107	.0118	.0096	.0128	.0151	.0162

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-3-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 15
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.308	35.308	211.880	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	115.775	115.775	260.451	400.260	434.122	
FUEL MASS, LB	13.507	36.662	19.534	16.677	3.618	89.998
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.506	4.506	.511	.115	.304	2.656
RATE, LB HC/HR	.522	.522	.133	.046	.132	.428
MASS, LB HC	.061	.165	.010	.002	.001	.239
MASS, PERCENT OF TOTAL CYCLE	25.5	69.1	4.2	.8	.5	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.762
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.215	21.215	6.244	.986	1.674	13.432
RATE, LB CO/HR	2.456	2.456	1.626	.395	.727	2.165
MASS, LB CO	.287	.778	.122	.016	.006	1.289
MASS, PERCENT OF TOTAL CYCLE	23.7	64.3	10.1	1.4	.5	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.025
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.422	3.422	8.619	10.785	10.752	6.209
RATE, LB NOX/HR	.396	.396	2.245	4.317	4.668	1.881
MASS, LB NOX	.046	.125	.168	.180	.039	.559
MASS, PERCENT OF TOTAL CYCLE	8.3	22.5	30.1	32.2	7.0	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						8.794

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

POLLUTANT	EPA LTO-CYCLE LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

POLLUTANT (MODE)	REQUIRED EMISSION INDEX, LBP/1000 LB FUEL A	B
CO (IDLE)	21.2	31.1
HC (IDLE)	4.5	5.9
NOX (TAKEOFF)	10.8	23.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

**** AIRESEARCH EMISSION TEST SUMMARY ****

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 15
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 70.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 308.0 FLO,L/M= 14.160 SL TIM,S= 6.5800

DATA POINT NUMBER	302	303	304	305	306	307	308
PERCENT MAX. CORRECTED POWER	4.9	7.4	9.8	30.5	70.1	89.4	99.4
CORRECTED SHAFT HP	34.9	52.5	69.2	215.0	495.2	631.2	701.8
MEASURED SHAFT HP	33.6	50.8	67.1	207.2	477.6	610.5	679.4
SHAFT SPEED, N1, RPM	27520.0	27540.0	27510.0	41760.0	41770.0	41780.0	41750.0
COMPRESSOR INLET TEMP.,DEG.F	57.0	61.0	63.0	57.3	58.0	61.0	62.0
COMPRESSOR DSCHG. PRES.,PSIA	48.9	48.9	49.6	136.1	143.4	146.4	147.8
COMPRESSOR DSCHG. TEMP,DEG F	319.0	324.0	325.0	639.0	651.0	657.0	661.0
TURB INTERSTAGE TEMP., DEG,F	875.0	943.0	1011.0	1098.0	1318.0	1389.0	1450.0
CORR BELMTH FLOW, LB/SEC	2.97	2.98	2.85	7.92	7.87	7.84	7.81
FA RATIO BASED ON BELLMTH.	.0112	.0115	.0132	.0094	.0129	.0148	.0157
MEASURED FUEL FLOW, LB/HR	116.0	116.0	130.0	260.0	352.0	402.0	425.5
FA RATIO CALC. FROM EMISSION	.0097	.0107	.0118	.0096	.0128	.0151	.0162
EQUIVALENCE RATIO	.142	.157	.172	.140	.188	.221	.238
LOADING W/P**N/V/E(T/540)	.319	.387	.294	.078	.069	.066	.064
COMB EFFIC FROM EMISSIONS	99.097	99.489	99.522	99.831	99.956	99.969	99.971
**** SUMMARY OF REDUCED EMISSION DATA ****							
CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.00	2.22	2.45	2.00	2.70	3.18	3.43
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	360.5	362.1	406.5	817.4	1189.2	1267.1	1341.3
CARBON MONOXIDE							
PPM BY VOLUME, WET	215.7	187.9	176.4	58.9	23.9	19.8	19.4
LB. PER 1000 LB. OF FUEL	21.331	16.821	14.349	5.896	1.776	1.253	1.139
WEIGHT FLOW, LB./HR.	2.474	1.951	1.865	1.533	.625	.504	.484
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	81.0	43.5	34.5	6.8	.6	.6	.6
LB. PER 1000 LB. OF FUEL	4.579	2.227	1.604	.343	.025	.022	.020
WEIGHT FLOW, LB./HR.	.531	.258	.209	.089	.009	.009	.009
RATIO LB HC/LB CO	.2146	.1324	.1118	.0582	.0144	.0173	.0176
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	14.7	19.1	22.5	41.0	77.5	96.8	106.3
LB. PER 1000 LB. OF FUEL	2.388	2.810	3.006	6.737	9.463	9.957	10.221
WEIGHT FLOW, LB./HR.	.277	.326	.391	1.752	3.331	4.003	4.349
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.3	5.9	5.3	12.8	7.5	6.5	8.2
LB. PER 1000 LB. OF FUEL	1.023	.868	.708	2.103	.916	.674	.794
WEIGHT FLOW, LB./HR.	.119	.101	.092	.547	.322	.271	.338
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.0	25.0	27.8	53.8	85.0	102.5	114.5
LB. PER 1000 LB. OF FUEL	3.411	3.678	3.714	8.841	10.379	10.631	11.015
WEIGHT FLOW, LB./HR.	.396	.427	.483	2.299	3.653	4.274	4.687
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00705	.00710	.00707	.00708	.00708	.00708	.00708
SMOKE NUMBER	4.70	2.30	5.80	7.00	8.10	8.10	8.10
CORRECTED WEIGHT FLOW	.02114	.02129	.02121	.02124	.02124	.02124	.02124
SMOKE NUMBER	4.70	5.80	7.00	10.50	15.10	15.10	11.60
CORRECTED WEIGHT FLOW	.03529	.03548	.03542	.03539	.03539	.03539	.03539
SMOKE NUMBER	7.00	7.00	5.80	17.40	23.30	19.80	16.30
CORRECTED WEIGHT FLOW	.04941	.04967	.04959	.04955	.04955	.04955	.04955
SMOKE NUMBER	9.30	9.30	6.10	22.10	26.70	23.30	22.10
SMOKE NUMBER AT WA=8.023	6.43	6.10	6.70	14.40	18.50	16.70	14.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 15
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.338 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.105 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.294 LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	17.8 SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 8.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 15 DATE: 11-4-75 TIME: BARO PRESS.: 28.840 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 090 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	309	310	311	312	313	314	315
ACTUAL POWER SETTING, HORSEPOWER	31.7	50.3	70.0	202.2	476.1	608.8	678.6
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.65	7.40	10.31	29.77	70.03	89.43	99.81
N1 SPEED, RPM	27580.00	27530.00	27570.00	41730.00	41730.00	41740.00	41730.00
FUEL FLOW (MEAS.) LB./HR.	108.0	119.0	131.0	262.5	358.5	405.8	431.8
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.1	2.9	2.9	7.9	7.9	7.9	7.9
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	61.00	58.00	57.00	57.00	58.00	58.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	14.17	14.17	14.17	14.17	14.17	14.17	14.17
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	48.87	49.12	49.71	135.81	143.17	147.35	149.31
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	322.00	320.00	321.00	640.00	650.00	655.00	657.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	865.0	938.0	1012.0	1085.0	1260.0	1350.0	1380.0
EXHAUST GAS STATIC PRESSURE, PSIA	14.15	14.15	14.15	14.05	14.06	14.09	14.11
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	83.100	45.000	34.500	6.000	.600	.600	.600
CARBON MONOXIDE (CO), PPMV	215.222	190.114	170.987	63.134	30.399	19.646	15.821
TOTAL OXIDES OF NITROGEN (NOX), PPMV	23.200	25.200	29.500	54.500	82.500	102.750	110.000
CARBON DIOXIDE (CO2), PERCENT BY VOL.	1.968	2.170	2.447	1.963	2.687	3.060	3.358
NITRIC OXIDE (NO), PPMV	17.100	19.700	24.400	48.500	79.000	98.750	102.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	4.773	2.354	1.604	.349	.026	.022	.020
CARBON MONOXIDE (CO)	21.628	17.398	13.910	6.433	2.268	1.301	.945
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.830	3.788	3.942	9.122	10.112	11.064	10.797
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.515	.288	.210	.092	.009	.009	.009
CARBON MONOXIDE (CO)	2.336	2.070	1.822	1.689	.813	.527	.407
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.414	.451	.516	2.394	3.625	4.481	4.653
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	99.07	99.38	99.53	99.82	99.94	99.97	99.98
F/A (EMISSIONS,CALC)	.0095	.0105	.0118	.0094	.0128	.0145	.0159

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-4-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 15
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.176	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	109.445	109.445	264.358	407.937	430.327	
FUEL MASS, LB	12.769	34.658	19.827	16.997	3.586	87.836
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	4.321	4.321	.302	.052	.876	2.414
RATE, LB HC/HR	.473	.473	.080	.021	.833	.388
MASS, LB HC	.055	.150	.006	.001	.000	.212
MASS, PERCENT OF TOTAL CYCLE	26.0	70.6	2.8	.4	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.338
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	21.026	21.026	6.425	1.332	.908	13.097
RATE, LB CO/HR	2.301	2.301	1.698	.543	.387	2.060
MASS, LB CO	.268	.729	.127	.023	.003	1.150
MASS, PERCENT OF TOTAL CYCLE	23.3	63.3	11.1	2.0	.3	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.105
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.821	3.821	9.176	11.111	10.753	6.723
RATE, LB NOX/HR	.418	.418	2.426	4.533	4.627	1.058
MASS, LB NOX	.049	.132	.182	.189	.039	.591
MASS, PERCENT OF TOTAL CYCLE	8.3	22.4	30.8	32.0	6.5	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						9.294

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	21.0	32.7
HC (IDLE)	4.3	6.4
NOX (TAKEOFF)	10.8	21.6

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 15
RAT SHP= 786. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007500
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/H= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	309	310	311	312	313	314	315
PERCENT MAX. CORRECTED POWER	4.6	7.4	10.3	29.8	70.0	89.4	99.8
CORRECTED SHAFT HP	32.8	52.2	72.8	210.2	494.4	631.4	704.7
MEASURED SHAFT HP	31.7	50.3	70.0	202.2	476.1	608.0	678.6
SHAFT SPEED, N1, RPM	27580.0	27530.0	27570.0	41730.0	41730.0	41740.0	41730.0
COMPRESSOR INLET TEMP.,DEG.F	61.0	58.0	57.8	57.0	58.0	58.8	58.8
COMPRESSOR DSCHG. PRES.,PSIA	48.9	49.1	49.7	135.8	143.2	147.3	149.3
COMPRESSOR DSCHG. TEMP.,DEG F	322.0	320.8	321.0	640.0	650.0	655.0	657.0
TURB INTERSTAGE TEMP., DEG.F	865.0	938.0	1012.0	1066.0	1260.0	1350.0	1380.0
CORR BELMTH FLOW, LB/SEC	3.06	2.92	2.86	7.90	7.90	7.87	7.87
FA RATIO BASED ON BELLMTH.	.0102	.0117	.0132	.0096	.0131	.0148	.0158
MEASURED FUEL FLOW, LB/HR	108.0	119.8	131.0	262.5	356.5	405.0	431.0
FA RATIO CALC. FROM EMISSION	.0095	.0105	.0118	.0094	.0128	.0145	.0159
EQUIVALENCE RATIO	.140	.153	.172	.138	.188	.213	.234
LOADING W/P**N/V/E(T/540)	.325	.318	.297	.078	.070	.066	.064
COMB EFFIC FROM EMISSIONS	99.073	99.384	99.532	99.818	99.944	99.967	99.976

**********SUMMARY OF REDUCED EMISSION DATA**********

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	1.97	2.17	2.45	1.96	2.69	3.06	3.36
LB. CO2 PER LB. OF FUEL	3.11	3.12	3.13	3.14	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	335.6	371.3	409.7	825.0	1129.4	1276.5	1356.7
CARBON MONOXIDE							
PPM BY VOLUME, WET	215.2	190.1	171.8	63.1	30.4	19.8	15.8
LB. PER 1000 LB. OF FUEL	21.628	17.398	13.910	6.433	2.268	1.301	.945
WEIGHT FLOW, LB./HR.	2.336	2.070	1.822	1.689	.813	.527	.407
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	83.1	45.0	34.5	6.0	.6	.6	.6
LB. PER 1000 LB. OF FUEL	4.773	2.354	1.604	.349	.026	.022	.028
WEIGHT FLOW, LB./HR.	.515	.280	.210	.092	.009	.009	.009
RATIO LB HC/LB CO	.2207	.1353	.1153	.0543	.0113	.0173	.0217
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	17.1	19.7	24.4	48.6	79.0	98.8	102.5
LB. PER 1000 LB. OF FUEL	2.823	2.961	3.261	6.795	9.683	10.633	10.061
WEIGHT FLOW, LB./HR.	.305	.352	.427	1.784	3.471	4.306	4.336
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	6.1	5.5	5.1	13.9	3.5	4.8	7.5
LB. PER 1000 LB. OF FUEL	1.007	.827	.682	2.327	.429	.431	.736
WEIGHT FLOW, LB./HR.	.109	.098	.089	.611	.154	.174	.317
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	23.2	25.2	29.5	54.5	82.5	102.7	110.0
LB. PER 1000 LB. OF FUEL	3.830	3.788	3.942	9.122	10.112	11.064	10.797
WEIGHT FLOW, LB./HR.	.414	.451	.516	2.394	3.625	4.481	4.653
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00720	.00717	.00717	.00713	.00715	.00788	.00694
SMOKE NUMBER	5.80	3.50	5.80	5.80	8.10	8.10	8.10
CORRECTED WEIGHT FLOW	.02160	.02152	.02152	.02138	.02146	.02101	.02082
SMOKE NUMBER	8.10	7.00	8.10	12.80	12.80	14.80	14.80
CORRECTED WEIGHT FLOW	.03593	.03586	.03586	.03570	.03577	.03501	.03470
SMOKE NUMBER	8.10	7.00	5.80	16.30	22.10	20.90	18.60
CORRECTED WEIGHT FLOW	.05038	.05021	.05021	.04998	.05007	.04901	.04856
SMOKE NUMBER	9.30	9.30	9.30	19.80	27.90	24.40	19.80
SMOKE NUMBER AT WA=0.023	7.80	6.70	7.30	13.70	17.80	17.10	15.30

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LAC02 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-8-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 16
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	5.134	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	19.849	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	5.173	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.2	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 78 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.:
USER: MODEL NO.:
ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 16 DATE: 11-8-75 TIME: BARO PRESS.: 19.700 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	316	317	318	319	320	321	322
ACTUAL POWER SETTING, HORSEPOWER	23.2	34.3	46.5	148.1	325.1	418.4	464.9
CORR. POWER SETTING (STD DAY), PERCENT RATED	4.99	7.36	9.99	30.18	69.93	90.01	100.00
N1 SPEED, RPM	27550.00	27550.00	27550.00	41740.00	41720.00	41740.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	74.8	84.0	90.8	187.8	251.0	286.8	315.8
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	3.8	2.8	2.8	7.7	7.6	7.6	7.6
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	58.00	63.00	60.00	58.00	59.00	59.00	59.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	9.67	9.67	9.67	9.67	9.67	9.67	9.67
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	33.64	33.64	33.89	92.34	96.76	99.46	188.93
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	315.00	322.00	322.00	643.00	656.00	663.00	668.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	914.0	995.0	1060.0	1120.0	1225.0	1328.0	1524.0
EXHAUST GAS STATIC PRESSURE, PSIA	-0.00	9.67	9.67	9.56	9.59	9.61	9.61
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	174.000	117.000	98.000	32.700	5.400	3.000	2.400
CARBON MONOXIDE (CO), PPMV	320.163	284.384	244.424	153.948	67.339	36.952	31.216
TOTAL OXIDES OF NITROGEN (NOX), PPMV	18.200	22.600	24.600	49.500	77.000	90.000	98.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.056	2.376	2.602	2.117	2.862	3.297	3.513
NITRIC OXIDE (NO), PPMV	13.800	18.700	21.700	29.500	65.500	84.250	96.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	9.482	5.556	3.918	1.756	.216	.104	.078
CARBON MONOXIDE (CO)	30.524	23.626	18.616	14.466	4.711	2.247	1.782
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	2.850	3.084	3.078	7.641	8.850	8.990	9.259
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.702	.467	.353	.328	.054	.030	.025
CARBON MONOXIDE (CO)	2.259	1.985	1.675	2.705	1.183	.643	.561
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.211	.259	.277	1.429	2.221	2.571	2.917
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.45	98.96	99.22	99.51	99.87	99.94	99.95
F/A (EMISSIONS,CALC)	.0108	.0115	.0125	.0102	.0136	.0157	.0167

EPA CYCLE EMISSIONS COMPUTATION SUMMARY

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG VJ8 N136 CALC DATE :11-8-75
MODEL NO.: TPE331-5-251M S/N: P84001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 1
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 16
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	74.056	74.056	185.484	285.957	315.005	
FUEL MASS, LB	8.640	23.451	13.911	11.915	2.625	60.542
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	9.457	9.457	1.802	.105	.078	5.451
RATE, LB HC/HR	.700	.700	.334	.030	.025	.591
MASS, LB HC	.082	.222	.025	.001	.000	.330
MASS, PERCENT OF TOTAL CYCLE	24.8	67.2	7.6	.4	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						5.194
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	30.487	30.487	14.418	2.245	1.782	19.992
RATE, LB CO/HR	2.258	2.258	2.674	.642	.561	2.168
MASS, LB CO	.263	.715	.281	.027	.005	1.218
MASS, PERCENT OF TOTAL CYCLE	21.8	59.1	16.6	2.2	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						19.049
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	2.852	2.852	7.601	8.990	9.259	5.429
RATE, LB NOX/HR	.211	.211	1.410	2.571	2.917	.589
MASS, LB NOX	.025	.067	.106	.107	.024	.329
MASS, PERCENT OF TOTAL CYCLE	7.5	20.4	32.2	32.6	7.4	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						5.173

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	38.5	45.8
HC (IDLE)	8.9	8.9
NOX (TAKEOFF)	9.3	43.9

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P0+001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 16
RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. RE. HUM= 70.00 SPEC HUM= .007508
FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	316	317	318	319	320	321	322
PERCENT MAX. CORRECTED POWER	5.0	7.4	10.0	30.2	69.9	90.0	100.0
CORRECTED SHAFT HP	35.2	51.9	70.6	213.0	493.7	635.5	706.0
MEASURED SHAFT HP	23.2	34.3	46.5	140.1	325.1	418.4	464.9
SHAFT SPEED, N1, RPM	27560.0	27550.0	27550.0	41740.0	41720.0	41740.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	58.0	63.0	60.0	58.0	59.0	59.0	59.0
COMPRESSOR DSCHG. PRES.,PSIA	33.6	33.6	33.9	92.3	96.8	99.5	100.9
COMPRESSOR DSCHG. TEMP,DEG F	315.0	322.0	322.0	643.0	656.0	663.0	668.0
TURB INTERSTAGE TEMP., DEG.F	914.0	995.0	1060.0	1120.0	1225.0	1320.0	1524.0
CORR BELLMTH FLOW, LB/SEC	3.04	2.82	2.76	7.69	7.63	7.64	7.63
FA RATIO BASED ON BELLMTH.	.0103	.0126	.0138	.0102	.0139	.0158	.0174
MEASURED FUEL FLOW, LB/HR	74.0	84.0	90.0	187.0	251.0	286.0	315.0
FA RATIO CALC. FROM EMISSION	.0100	.0115	.0125	.0102	.0136	.0157	.0167
EQUIVALENCE RATIO	.147	.169	.184	.149	.200	.229	.244
LOADING W/P**N/V/E(T/540)	.431	.392	.381	.101	.090	.085	.082
COMB EFFIC FROM EMISSIONS	98.450	98.957	99.218	99.506	99.870	99.938	99.951

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.06	2.38	2.60	2.12	2.86	3.30	3.51
LB. CO2 PER LB. OF FUEL	3.08	3.10	3.11	3.13	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	227.9	260.5	280.3	584.7	789.7	901.0	992.6
CARBON MONOXIDE							
PPM BY VOLUME, WET	320.2	284.4	244.4	153.9	67.3	37.0	31.2
LB. PER 1000 LB. OF FUEL	30.524	23.626	18.616	14.466	4.711	2.247	1.782
WEIGHT FLOW, LB./HR.	2.259	1.985	1.675	2.705	1.183	.643	.561
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	174.0	117.0	90.0	32.7	5.4	3.0	2.4
LB. PER 1000 LB. OF FUEL	9.482	5.556	3.918	1.756	.216	.104	.078
WEIGHT FLOW, LB./HR.	.702	.467	.353	.328	.054	.030	.025
RATIO LB HC/LB CO	.3106	.2352	.2105	.1214	.0458	.0464	.0439
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	13.8	18.7	21.7	29.5	65.5	84.2	96.3
LB. PER 1000 LB. OF FUEL	2.161	2.552	2.715	4.554	7.528	8.416	9.025
WEIGHT FLOW, LB./HR.	.160	.214	.244	.852	1.889	2.487	2.843
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.4	3.9	2.9	28.8	11.5	5.8	2.5
LB. PER 1000 LB. OF FUEL	.689	.532	.363	3.087	1.322	.574	.234
WEIGHT FLOW, LB./HR.	.051	.045	.033	.577	.332	.164	.074
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	18.2	22.6	24.6	49.5	77.0	90.0	98.8
LB. PER 1000 LB. OF FUEL	2.850	3.084	3.078	7.641	8.850	8.990	9.259
WEIGHT FLOW, LB./HR.	.211	.259	.277	1.429	2.221	2.571	2.917
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00705	.00703	.00700	.00709	.00709	.00709	.00711
SMOKE NUMBER	3.50	3.50	3.50	5.20	9.30	8.10	8.10
CORRECTED WEIGHT FLOW	.02116	.02109	.02102	.02123	.02128	.02128	.02132
SMOKE NUMBER	5.80	4.70	3.50	8.10	12.80	11.00	16.30
CORRECTED WEIGHT FLOW	.03527	.03515	.03503	.03546	.03546	.03546	.03553
SMOKE NUMBER	7.00	5.80	5.20	9.30	16.30	18.60	16.90
CORRECTED WEIGHT FLOW	.04938	.04920	.04895	.04964	.04964	.04974	.04974
SMOKE NUMBER	9.30	8.10	5.20	12.20	22.10	20.30	19.20
SMOKE NUMBER AT WA=0.023	6.40	5.60	4.40	8.80	15.20	14.60	15.20

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-8-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 16
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18478. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDERAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	3.979	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	16.792	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	5.450	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	15.6	SMOKE NUMBER, MAXIMUM AT CRUISE MODE, 70 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

**********OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 16 DATE: 11-8-75 TIME: BARO PRESS.: 19.700 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	323	324	325	326	327	328	329
ACTUAL POWER SETTING, HORSEPOWER	23.4	34.5	46.3	139.1	325.8	417.4	465.1
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.01	7.39	9.98	29.86	69.91	89.79	100.15
N1 SPEED, RPM	27590.00	27530.00	27550.00	41720.00	41740.00	41740.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	76.0	83.0	92.0	185.0	252.5	286.0	304.5
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.8	2.8	7.7	7.6	7.6	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	62.00	62.00	58.00	61.00	59.00	59.00	58.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	9.67	9.67	9.67	9.67	9.67	9.67	9.67
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	33.15	33.40	33.64	91.60	96.51	99.21	100.93
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	316.00	323.00	321.00	647.00	659.00	665.00	666.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	932.0	995.0	1052.0	1070.0	1235.0	1464.0	1520.0
EXHAUST GAS STATIC PRESSURE, PSIA	9.67	9.67	9.67	9.57	9.59	9.60	9.62
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	129.000	117.000	94.500	33.300	4.200	2.700	1.800
CARBON MONOXIDE (CO), PPMV	314.249	288.501	259.167	150.379	67.339	37.775	29.991
TOTAL OXIDES OF NITROGEN (NOX), PPMV	21.000	25.300	28.100	50.500	76.500	88.750	96.250
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.117	2.326	2.581	2.034	2.862	3.267	3.463
NITRIC OXIDE (NO), PPMV	16.800	21.600	26.500	29.100	65.500	84.500	92.500
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	6.847	5.672	4.144	1.889	.168	.095	.060
CARBON MONOXIDE (CO)	29.160	24.469	19.682	14.292	4.712	2.318	1.737
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.283	3.525	3.541	7.884	8.792	8.947	9.156
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.528	.471	.381	.335	.842	.027	.018
CARBON MONOXIDE (CO)	2.218	2.031	1.829	2.644	1.190	.663	.529
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.243	.293	.326	1.459	2.220	2.559	2.788
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.71	98.93	99.17	99.31	99.87	99.94	99.95
F/A (EMISSIONS,CALC)	.0103	.0113	.0125	.0101	.0136	.0155	.0164

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-8-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 2
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 16
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.926 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.000	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	706.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.540
FUEL FLOW, LB/HR	75.968	75.968	185.648	286.564	384.515	
FUEL MASS, LB	8.863	24.056	13.924	11.940	2.538	61.321
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	6.851	6.851	1.833	.125	.105	4.123
RATE, LB HC/HR	.520	.520	.340	.036	.032	.453
MASS, LB HC	.861	.165	.026	.001	.000	.253
MASS, PERCENT OF TOTAL CYCLE	24.8	65.2	18.1	.6	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						3.979
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	29.204	29.204	14.340	2.373	1.847	19.472
RATE, LB CO/HR	2.219	2.219	2.662	.680	.562	2.139
MASS, LB CO	.259	.703	.200	.028	.005	1.194
MASS, PERCENT OF TOTAL CYCLE	21.7	58.8	16.7	2.4	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.792
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.208	3.208	7.931	8.979	9.195	5.648
RATE, LB NOX/HR	.243	.243	1.472	2.573	2.688	.628
MASS, LB NOX	.028	.077	.110	.107	.023	.346
MASS, PERCENT OF TOTAL CYCLE	8.2	22.2	31.9	31.0	6.7	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						5.458

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	29.2	44.7
HC (IDLE)	6.9	8.6
NOX (TAKEOFF)	9.2	42.5

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P84001 COMB P/N= 869082-4 FUEL= AV. KERO. TEST NO.= 16

RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 5. REL HUM= 78.00 SPEC HUM= .007588

FUEL H/C= 1.9280 STOI F/A= .06822 L H V= 18470. S LN T,F= 388.8 FLO,L/H= 14.168 SL TIM,S= 6.5088

DATA POINT NUMBER	323	324	325	326	327	328	329
PERCENT MAX. CORRECTED POWER	5.8	7.4	10.0	29.9	69.9	89.8	100.2
CORRECTED SHAFT HP	35.4	52.2	70.4	210.8	493.6	633.9	707.1
MEASURED SHAFT HP	23.4	34.5	46.3	139.1	325.8	417.4	465.1
SHAFT SPEED, N1, RPM	27530.0	27530.0	27550.0	41720.0	41740.0	41740.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	62.0	62.0	58.0	61.0	59.0	59.0	58.0
COMPRESSOR DSCHG. PRES.,PSIA	33.2	33.4	33.6	91.6	96.5	99.2	100.9
COMPRESSOR DSCHG. TEMP,DEG F	316.0	323.0	321.0	647.0	659.0	665.0	666.0
TURB INTERSTAGE TEMP., DEG.F	932.0	995.0	1052.0	1078.0	1235.0	1464.0	1520.0
CORR BELMTH FLOW, LB/SEC	2.91	2.79	2.81	7.68	7.63	7.63	7.65
FA RATIO BASED ON BELLMTH.	.0110	.0126	.0138	.0102	.0140	.0158	.0168
MEASURED FUEL FLOW, LB/HR	76.0	83.0	92.0	185.0	252.5	286.0	304.5
FA RATIO CALC. FROM EMISSION	.0103	.0113	.0125	.0101	.0136	.0155	.0164
EQUIVALENCE RATIO	.151	.165	.183	.148	.200	.227	.241
LOADING W/P**N/V/E(T/540)	.421	.394	.394	.102	.090	.085	.083
COMB EFFIC FROM EMISSIONS	98.713	98.927	99.169	99.505	99.674	99.937	99.954

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.12	2.33	2.58	2.09	2.86	3.27	3.46
LB. CO2 PER LB. OF FUEL	3.09	3.10	3.11	3.13	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	234.8	257.3	286.3	578.4	794.4	900.9	959.5
CARBON MONOXIDE							
PPM BY VOLUME, WET	314.2	288.5	259.2	150.4	67.3	37.8	30.8
LB. PER 1000 LB. OF FUEL	29.180	24.469	19.882	14.292	4.712	2.318	1.737
WEIGHT FLOW, LB./HR.	2.218	2.031	1.829	2.644	1.190	.663	.529
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	129.0	117.0	94.5	33.3	4.2	2.7	1.8
LB. PER 1000 LB. OF FUEL	6.847	5.672	4.144	1.809	.168	.095	.068
WEIGHT FLOW, LB./HR.	.520	.471	.381	.335	.042	.027	.018
RATIO LB HC/LB CO	.2346	.2318	.2084	.1266	.0357	.0489	.0343
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	16.8	21.6	26.5	29.1	65.5	84.5	92.5
LB. PER 1000 LB. OF FUEL	2.563	3.089	3.339	4.543	7.528	8.519	8.799
WEIGHT FLOW, LB./HR.	.195	.25	.307	.840	1.901	2.436	2.679
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.2	3.7	1.6	21.4	11.0	4.3	3.8
LB. PER 1000 LB. OF FUEL	.641	.515	.222	3.341	1.264	.428	.357
WEIGHT FLOW, LB./HR.	.049	.043	.019	.618	.319	.123	.109
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	21.0	25.3	28.1	50.5	76.5	88.8	96.3
LB. PER 1000 LB. OF FUEL	3.203	3.525	3.541	7.884	8.792	8.947	9.156
WEIGHT FLOW, LB./HR.	.243	.293	.326	1.459	2.220	2.559	2.788
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00691	.00689	.00692	.00716	.00716	.00748	.00713
SMOKE NUMBER	2.30	4.70	3.50	8.10	9.30	5.80	5.80
CORRECTED WEIGHT FLOW	.02074	.02067	.02075	.02147	.02147	.02143	.02139
SMOKE NUMBER	4.70	5.80	4.70	8.10	14.00	13.40	9.90
CORRECTED WEIGHT FLOW	.03457	.03446	.03458	.03579	.03579	.03572	.03565
SMOKE NUMBER	5.80	7.00	3.50	9.30	17.40	15.10	14.00
CORRECTED WEIGHT FLOW	.04840	.04824	.04841	.05011	.05011	.05001	.04991
SMOKE NUMBER	8.70	8.10	5.80	12.80	21.50	19.20	20.30
SMOKE NUMBER AT WA=8.823	5.50	6.50	4.40	9.60	15.60	13.40	12.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).

********** AIRESEARCH EMISSION TEST SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-8-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 706.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 16
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

******** EXHAUST EMISSIONS PER EPA CYCLE OF WORK OUTPUT ** CODE OF FEDEPAL REGULATIONS TITLE 40 PART 87 17 JULY 1973 ********

HYDROCARBONS (CH AS CH4)	4.890	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
CARBON MONOXIDE (CO)	18.436	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
OXIDES OF NITROGEN (NOX AS NO2)	9.235	LB. POLLUTANT PER 1000 HP.-HR. PER CYCLE
SMOKE	14.6	SMOKE NUMBER, MAXIMUM AT TAKE-OFF MODE, 100 PERCENT RATED POWER

TAXI-IDLE SETTING: 5.0 PERCENT RATED TAKEOFF POWER AT 65. PERCENT RATED TAKEOFF N1 RPM

********** ENGINE DESCRIPTION **********

COMB TYPE: REVERSE FLOW ANNULAR P/N: 869082-4 SUR/VOL: 1.260 FUEL INJ TYPE: STAGED SIMPLEX
ENGINE TOTAL SERVICE: 0.0 HR TIME SINCE ENGINE OVERHAUL: 0.0 HR
ENGINE ASSEMBLY AND MAINTENANCE INFORMATION:
AIRCRAFT INSTALLATION **** MFR.: MODEL NO.:
USER: ENGINE INSTALLATION POSITION:

********** OPERATIONAL TEST DATA SUMMARY **********

GASEOUS EMISSION TEST NO.: 16 DATE: 11-8-75 TIME: BARO PRESS.: 19.700 IN. HGA.
AMBIENT AIR TEMP.: 59.00 DEG. F RELATIVE HUMIDITY: 70.00 PERCENT SPECIFIC HUMIDITY: .007500 LB. H2O/LB. DRY AIR
AMBIENT AIR QUALITY HYDROCARBONS (HC): 0.0 PPMC CARBON MONOXIDE (CO): 0.0 PPMV OXIDES OF NITROGEN (NOX): 0.0 PPMV
SAMPLE LINE *** TEMP.: 300.00 DEG. F. FLOWRATE: 14.16 LITERS/MIN. TRANSPORT TIME: 6.50 SEC. LENGTH: 50.00 FT.

********** COMPUTED EMISSIONS **********

TEST CONDITION	330	331	332	333	334	335	336
ACTUAL POWER SETTING, HORSEPOWER	23.3	34.2	46.5	140.4	324.2	419.4	467.1
CORR. POWER SETTING (STD DAY), PERCENT RATED	5.01	7.34	9.99	30.16	69.88	90.31	100.49
N1 SPEED, RPM	27570.00	27560.00	27560.00	41730.00	41740.00	41740.00	41740.00
FUEL FLOW (MEAS.) LB./HR.	76.8	82.8	89.0	191.8	252.5	286.8	308.5
CORR. ENGINE CORE AIRFLOW (MEAS), LB/SEC	2.9	2.8	2.7	7.7	7.7	7.6	7.7
COMPRESSOR INLET AIR TOTAL TEMP., DEG F	62.00	61.00	61.00	60.00	57.00	58.00	59.00
COMPRESSOR INLET AIR TOTAL PRESS., PSIA	9.67	9.67	9.67	9.67	9.67	9.67	9.67
COMPRESSOR DISCHARGE AIR TOTAL PRESS., PSIA	33.15	33.64	33.79	91.85	94.65	99.71	101.18
COMPRESSOR DISCHARGE AIR TOTAL TEMP., DEG F	323.00	322.00	323.00	646.00	654.00	661.00	664.00
TURBINE INTERSTAGE GAS TOTAL TEMP., DEG F	922.0	982.0	1063.0	1060.0	1325.0	1450.0	1486.0
EXHAUST GAS STATIC PRESSURE, PSIA	9.67	9.67	9.67	9.57	9.58	9.61	9.61
EMISSION CONCENTRATION, WET ANALYSIS							
HYDROCARBON (HC AS CH4), PPMC	135.000	117.000	102.000	32.400	5.400	3.000	2.700
CARBON MONOXIDE (CO), PPMV	310.511	297.849	274.195	151.713	69.024	35.720	27.546
TOTAL OXIDES OF NITROGEN (NOX), PPMV	20.400	23.000	27.500	48.500	75.200	86.250	93.750
CARBON DIOXIDE (CO2), PERCENT BY VOL.	2.141	2.361	2.608	2.117	2.851	3.297	3.482
NITRIC OXIDE (NO), PPMV	19.700	19.200	24.400	29.500	63.400	82.500	90.250
EMISSION INDEX, LB. POLLUTANT/1000 LB. FUEL							
HYDROCARBONS (HC AS CH4)	7.086	5.587	4.424	1.741	.217	.184	.089
CARBON MONOXIDE (CO)	28.516	24.885	20.809	14.259	4.848	2.172	1.587
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	3.077	3.157	3.428	7.487	8.676	8.616	8.671
EMISSION RATE, LB. POLLUTANT/HR.							
HYDROCARBONS (HC AS CH4)	.539	.458	.394	.332	.055	.038	.027
CARBON MONOXIDE (CO)	2.167	2.041	1.852	2.723	1.224	.621	.490
TOTAL OXIDES OF NITROGEN (NOX AS NO2)	.234	.259	.305	1.430	2.191	2.464	2.737
COMBUSTION EFFICIENCY, PERCENT (EMISSIONS)	98.71	98.92	99.12	99.51	99.87	99.94	99.95
F/A (EMISSIONS,CALC)	.0104	.0114	.0126	.0102	.0136	.0157	.0165

********** EPA CYCLE EMISSIONS COMPUTATION SUMMARY **********

ENG MFG : AIRESEARCH TEST FACIL : PHX LACC2 INSTR DESCRIP : FED REG V38 N136 CALC DATE :11-8-75
MODEL NO.: TPE331-5-251M S/N: P04001 ENGINE TYPE(CLASS): TURBOPROP CALC ID: 3
RATED POWER: 786.0 SHP AT SEA LEVEL STANDARD DAY CONDITIONS TEST NO: 16
FUEL: ASTM D1655-73 ATOMIC H/C RATIO: 1.928 LHV: 18470. BTU/LB ADDITIVES: NONE

MODE	TAXI-IDLE (IN)	TAXI-IDLE (OUT)	APPROACH	CLIMBOUT	TAKEOFF	TOTAL PER CYCLE
TIME IN MODE, MINUTES	7.000	19.000	4.500	2.500	.500	33.500
RATED POWER, PERCENT	5.000	5.000	30.000	90.000	100.000	
CORRECTED POWER, HORSEPOWER	35.300	35.300	211.800	635.400	786.000	
HP-HR	4.118	11.178	15.885	26.475	5.883	63.548
FUEL FLOW, LB/HR	75.977	75.977	189.944	284.640	309.635	
FUEL MASS, LB	8.864	24.059	14.246	11.868	2.588	61.618
** HYDROCARBON EMISSION (HC) **						
INDEX, LB HC/1000 LB FUEL	7.093	7.093	1.749	.102	.098	4.218
RATE, LB HC/HR	.539	.539	.332	.029	.030	.465
MASS, LB HC	.063	.171	.025	.001	.000	.260
MASS, PERCENT OF TOTAL CYCLE	24.2	65.7	9.6	.5	.1	100.0
CYCLE, LB HC/1000 HORSEPOWER-HR PER CYCLE						4.090
** CARBON MONOXIDE EMISSIONS (CO) **						
INDEX, LB CO/1000 LB FUEL	28.529	28.529	14.213	2.076	1.962	19.014
RATE, LB CO/HR	2.168	2.168	2.700	.591	.607	2.098
MASS, LB CO	.253	.686	.202	.025	.005	1.171
MASS, PERCENT OF TOTAL CYCLE	21.6	58.6	17.3	2.1	.4	100.0
CYCLE, LB CO/1000 HORSEPOWER-HR PER CYCLE						18.436
** TOTAL OXIDES OF NITROGEN EMISSIONS (NOX) **						
INDEX, LB NOX/1000 LB FUEL	3.077	3.077	7.465	8.618	8.859	5.399
RATE, LB NOX/HR	.234	.234	1.418	2.451	2.743	.596
MASS, LB NOX	.027	.074	.106	.102	.023	.333
MASS, PERCENT OF TOTAL CYCLE	8.2	22.3	32.0	30.7	6.9	100.0
CYCLE, LB NOX/1000 HORSEPOWER-HR PER CYCLE						5.235

** EMISSION INDEX LEVELS REQUIRED TO MEET EPA 1979 STANDARDS FOR CLASS P2 ENGINES **

EPA LTO-CYCLE

POLLUTANT	LBP/1000 HORSEPOWER-HR-CYCLE
CO	26.8
HC	4.9
NOX	12.9

REQUIRED EMISSION INDEX, LBP/1000 LB FUEL

POLLUTANT (MODE)	A	B
CO (IDLE)	28.5	44.7
HC (IDLE)	7.1	8.7
NOX (TAKEOFF)	8.9	43.4

A ASSUMES PROPORTIONAL REDUCTION OF POLLUTANT EMISSION INDEX AT EACH LTO CYCLE MODE

B ASSUMES (1) REQUIRED REDUCTION IN CO AND HC OBTAINED BY LOWERING EMISSION INDEX VALUES AT TAXI-IDLE MODE ONLY, CO AND HC EMISSIONS AT OTHER MODES REMAIN UNCHANGED, (2) REQUIRED REDUCTION IN NOX OBTAINED BY LOWERING EMISSION INDEX VALUES AT CLIMBOUT AND TAKEOFF MODES IN SAME PROPORTION AS MEASURED VALUES, NOX EMISSIONS AT TAXI-IDLE AND APPROACH MODES REMAIN UNCHANGED

AIRESEARCH EMISSION TEST SUMMARY

ENGINE= TPE331-5-251M S/N= P04001 COMB P/N= 869062-4 FUEL= AV.KERO. TEST NO.= 16

RAT SHP= 706. RA EGT,F= 1650. RAT SPD= 41730. DEW PT,F= 51. REL HUM= 78.00 SPEC HUM= .007500

FUEL H/C= 1.9288 STOI F/A= .06822 L H V= 18478. S LN T,F= 300.0 FLO,L/M= 14.160 SL TIM,S= 6.5000

DATA POINT NUMBER	330	331	332	333	334	335	336
PERCENT MAX. CORRECTED POWER	5.0	7.3	10.0	30.2	69.9	90.3	100.5
CORRECTED SHAFT HP	35.4	51.6	70.5	213.0	493.4	637.6	709.5
MEASURED SHAFT HP	23.3	34.2	46.5	140.4	324.2	419.4	467.1
SHAFT SPEED, N1, RPM	27570.0	27560.0	27560.0	41730.0	41740.0	41740.0	41740.0
COMPRESSOR INLET TEMP.,DEG.F	62.0	61.0	61.0	60.0	57.0	58.0	59.0
COMPRESSOR DSCHG. PRES.,PSIA	33.2	33.6	33.8	91.8	94.6	93.7	101.2
COMPRESSOR DSCHG. TEMP.,DEG F	323.0	322.0	323.0	646.0	654.0	661.0	664.0
TURB INTERSTAGE TEMP., DEG.F	922.0	982.0	1063.0	1060.0	1325.0	1450.0	1486.0
CORR BELLMTH FLOW, LB/SEC.	2.98	2.83	2.75	7.68	7.68	7.64	7.66
FA RATIO BASED ON BELLMTH.	.0111	.0122	.0137	.0105	.0138	.0158	.0170
MEASURED FUEL FLOW, LB/HR	76.8	82.8	89.0	191.8	252.5	286.0	308.5
FA RATIO CALC. FROM EMISSION	.0104	.0114	.0126	.0102	.0136	.0157	.0165
EQUIVALENCE RATIO	.153	.168	.185	.149	.199	.229	.242
LOADING W/P**N/V/E(T/540)	.413	.395	.368	.181	.095	.085	.083
COMB EFFIC FROM EMISSIONS	98.739	98.924	99.122	99.512	99.867	99.940	99.955

SUMMARY OF REDUCED EMISSION DATA

CARBON DIOXIDE							
PERCENT BY VOLUME, WET	2.14	2.36	2.61	2.12	2.85	3.38	3.48
LB. CO2 PER LB. OF FUEL	3.09	3.19	3.11	3.13	3.15	3.15	3.15
WEIGHT FLOW, LB./HR.	234.8	254.2	276.7	597.2	794.3	901.0	972.2
CARBON MONOXIDE							
PPM BY VOLUME, WET	318.5	297.8	274.2	151.7	69.0	35.7	27.5
LB. PER 1000 LB. OF FUEL	28.516	24.885	20.889	14.259	4.848	2.172	1.587
WEIGHT FLOW, LB./HR.	2.167	2.041	1.852	2.723	1.224	.621	.490
UNBURNED HYDROCARBONS- PPM AS CARBON, WEIGHTS AS CH4							
PPM BY VOLUME, WET	135.0	117.0	102.0	32.4	5.4	3.0	2.7
LB. PER 1000 LB. OF FUEL	7.896	5.587	4.424	1.741	.217	.104	.089
WEIGHT FLOW, LB./HR.	.539	.458	.394	.332	.055	.030	.027
RATIO LB HC/LB CO	.2485	.2245	.2126	.1221	.0447	.0480	.0560
NITRIC OXIDE (NO) - WEIGHTS AS NO2							
PPM BY VOLUME, WET	15.7	19.2	24.4	29.5	63.4	82.5	90.2
LB. PER 1000 LB. OF FUEL	2.368	2.635	3.042	4.554	7.314	8.241	8.540
WEIGHT FLOW, LB./HR.	.180	.216	.271	.870	1.847	2.357	2.634
NITROGEN DIOXIDE (NO2)							
PPM BY VOLUME, WET	4.7	3.8	3.1	19.8	11.8	3.8	3.5
LB. PER 1000 LB. OF FUEL	.709	.522	.386	2.933	1.361	.375	.331
WEIGHT FLOW, LB./HR.	.054	.043	.034	.560	.344	.107	.102
TOTAL OXIDES OF NITROGEN (NO+NO2) AS NO2							
PPM BY VOLUME, WET	20.4	23.0	27.5	48.5	75.2	86.3	93.8
LB. PER 1000 LB. OF FUEL	3.077	3.157	3.428	7.487	8.676	8.616	8.871
WEIGHT FLOW, LB./HR.	.234	.259	.305	1.430	2.191	2.464	2.737
SMOKE MEASUREMENT DATA							
CORRECTED WEIGHT FLOW	.00695	.00693	.00693	.00717	.00716	.00716	.00716
SMOKE NUMBER	2.30	2.30	3.50	4.70	7.00	8.10	7.60
CORRECTED WEIGHT FLOW	.02084	.02080	.02080	.02151	.02147	.02147	.02147
SMOKE NUMBER	5.80	5.60	3.50	6.40	9.30	10.50	12.80
CORRECTED WEIGHT FLOW	.03473	.03467	.03467	.03585	.03578	.03578	.03578
SMOKE NUMBER	8.10	5.80	5.80	10.50	14.00	13.40	15.70
CORRECTED WEIGHT FLOW	.04863	.04854	.04854	.05019	.05009	.05009	.05009
SMOKE NUMBER	9.30	9.30	7.00	12.80	20.90	19.80	22.10
SMOKE NUMBER AT WA=0.023	6.50	5.90	5.80	8.60	12.80	13.80	14.60

NOTES 1. ALL EMISSIONS CONCENTRATIONS ARE WET VALUES.
2.EQUIVALENCE RATIO CALCULATED FROM CO2,CO,AND HC DATA AND FUEL COMPOSITION.
3.MASS EMISSIONS OF NO, NO2, AND NO+NO2 CALCULATED AS NO2 FROM CONCENTRATIONS WITH MOLECULAR WEIGHT OF NO2 (46.01).